FOUNDRY TRADE JOURNAL

EST. 1902

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

VOL. 110
No. 2325

JUNE 29, 1961

Registered at the G.P.O. as a Newspaper

Offices: John Adam House, John Adam St., London, W.C.2

Single Copy 1/-. By Post 1/4. Annual Subscription, Home 52/-, Abroad 60/- (Prepaid)

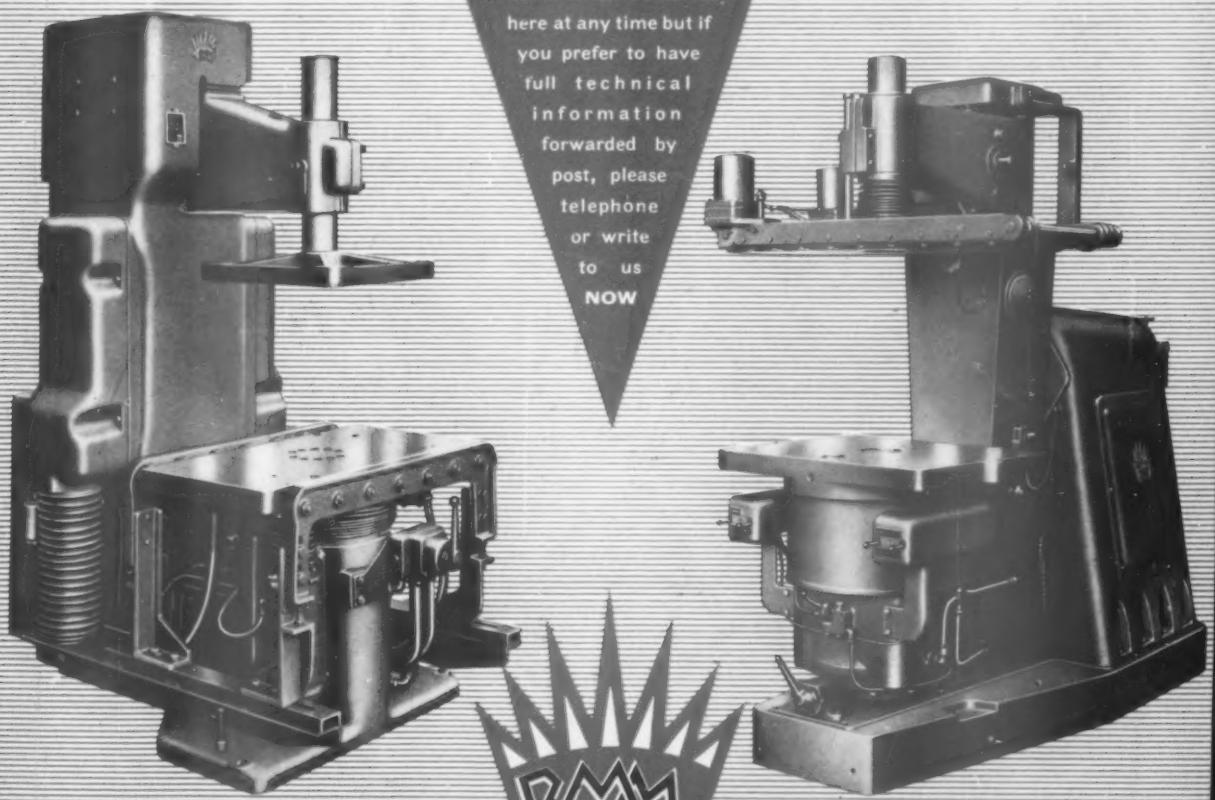
BQ Automatic

At once the fastest and most versatile automatic moulding machine available anywhere. A range of three sizes with any required method of pattern draw.

We are moulding machine specialists and are currently exporting to 47 different countries. At Weston Works visitors can see machines at all stages of manufacture, from the **foundry** to the **dispatch** bay. You will be welcomed here at any time but if you prefer to have full technical information forwarded by post, please telephone or write to us **NOW**

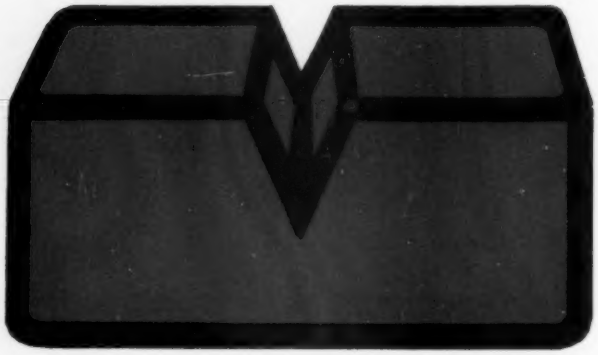
BT Turnover

Automatic jolt timer, automatic anvil and automatic mould removal. The finest turnover moulding machine in the world.



BRITISH MOULDING MACHINE CO. LTD.

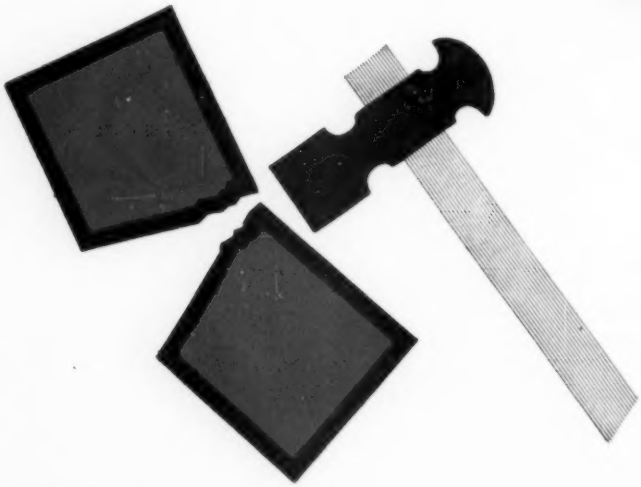
WESTON WORKS FAVERSHAM · KENT Tel: Faversham 2246/7/8 · 'grams: Easiram, Faversham



This is Union Carbide Service at Work

Look at one of the new Union Carbide briquettes and you'll see what we mean by Union Carbide service. This briquette is different from the old one in many ways and every point of difference is a point in favour of the customer. We set out to make a shape that the customer would find easier to handle, check, store and charge. That kept the Development section busy. Then somebody came up with the bright idea of making it a 2 lb. briquette that would crack into two accurate 1 lb. halves. That was a headache for the Quality Control department, because each half had to provide exactly the same amount of alloy. Now look at the briquette again and you'll see that we've done all we set out to do—and, a bonus. We got the price down and passed the saving on to the customer. That's what we call service.

UNION CARBIDE



The term UNION CARBIDE is a trade mark of UNION CARBIDE CORPORATION
UNION CARBIDE · ALLOYS DIVISION · 8 GRAFTON STREET · LONDON W1 · MAYFAIR 8100
BIRMINGHAM: CENTRAL 6301 · **GLASGOW:** DOUGLAS 7753 · **SHEFFIELD:** ROTHERHAM 4257
CRC A55

Every 60 minutes 240 ft of core!

This hand operated machine can also be supplied motorised

Built for utility — no risks of sand-clogging.
Built for strength — mounted on sturdy, cast-iron base.
Built for ease of operation — even by a junior.

The Spermolin Rotary Core Machine puts you a jump ahead with core production facilities.

LET US SEND YOU FULL DETAILS!

Four feet a minute—core from ½" to 3". The Spermolin Rotary Core Machine—adaptable, practical, reliable—is right in the forefront with clever self-adjusting, instant acting carrier that eliminates the production of faulty, bent and distorted cores.

Spermolin

Established over half a century

Rotary Core Machines

The secret of good casting

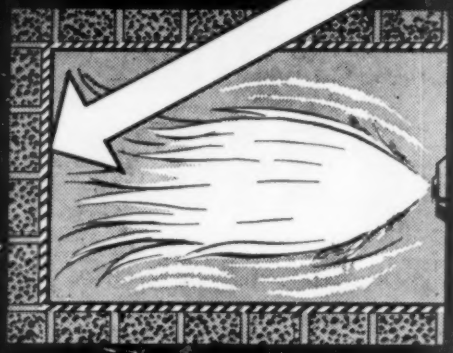
2 UNION STREET SOUTH · HALIFAX

A

FURNASCOTE

WILL *Treble furnace life!*

PROTECTS REFRACTORIES AGAINST THE VICIOUS ATTACK AND SAND-BLASTING EFFECT OF BURNING FUEL OILS



- CUTS OUT SLAGGING
- WIPES OUT "DOWN" TIME
- INCREASES WORKING LIFE OF CUPOLAS MANY TIMES
- REDUCES MAINTENANCE IN RE-LINING OF LADLES
- IDEAL FOR BOTH LOW AND HIGH TEMPERATURE WORK
- INCREASES PRODUCTION OF SMELTING IRON, STEEL & NON-FERROUS METALS

FURNASCOTE MORTAR as a priming coat will protect above 1,650° C. (3,000° F.).
FURNASCOTE HIGLAZE as a finishing coat will protect from 1,200° C. to 1,650° C. (2,200° F. to 3,000° F.)
FURNASCOTE NONVIT as a universal coat at LOW and HIGH temperatures, 10° C. to 2,000° C. (50° F. to 3,850° F.).
FURNASCOTE MORTAR plus **HIGLAZE** will protect to 2,000° C. (3,850° F.).

URGENT DELIVERIES MADE WITHIN 6 HOURS! Phone your nearest Stockist:—

BELFAST R. & J. Bow Ltd., Ocean Chambers 2, Donegal Square, E. Belfast. Tel.: 32108.

CORK & COBH Clayton Love & Sons Ltd., 18 Coach Street, Cork. Tel.: 23091/2.

DUBLIN L. R. Wood Ltd., 174 Pearse Street, Dublin. Tel.: 71415.

EDINBURGH R. & J. Bow Ltd., St. Andrews Square, Edinburgh. Tel.: Waverley 5541.

GLASGOW R. & J. Bow Ltd., 21 West Nile Street. Tel.: Central 4275.

KENT C. Brewer & Sons Ltd., 78/80, Easthill, Dartford. Tel.: 24447.

LANCASHIRE John Kay & Son (Bury) Ltd., Tenterden Street, Bury. Tel.: 5074/6.

LINCOLNSHIRE Yorkshire Anti Corrosion Ltd., 31 Park Drive. Tel.: Harrogate 6448.

LONDON (WEST) J. A. Davies (Steel) Ltd., 69, Becklow Road, Shepherds Bush. Tel.: SHE. 2126.

MILFORD HAVEN The Milford Haven Marine Services Ltd., Pembroke Dock. Tel.: 476.

SOUTHAMPTON Clayton Love & Sons Ltd., 48 High Street, Southampton. Tel. 27487.

SURREY C. Brewer & Sons Ltd., Old Palace Road, Croydon. Tel.: 7231.

SUSSEX C. Brewer & Sons Ltd., 14, High Street, Crawley. Tel.: 25356.

TYNESIDE Steels of Sunderland Ltd., High Street East, Sunderland. Tel.: 57136.

WEARSIDE Henry Foster & Sons Ltd., Railway Street, Bishop Auckland. Tel.: 771.

YORKSHIRE (Sth.) Yorkshire Anti Corrosion Co. Ltd., 31 Park Drive. Tel.: Harrogate 6448.

REPRESENTATIVES (not Stockists)

BIRMINGHAM M. Reilly, 181 Lichfield Road, Sutton Coldfield. Tel.: Four Oaks 433.

SHEFFIELD G. S. Smith, 533 Eccleshall Road, Sheffield 11. Tel.: Sheffield 63260.

For any further information write or phone Head Office :

CORROSION LIMITED • MALVERN ROAD • SOUTHAMPTON • TEL: 71347

TAKE IT UP WITH SPA.

Trap that dust BEFORE it can do any harm! At source! With SPA!
Using the unique principle of *Selective Particle Acceleration, SPA collects harmful—and often profitable—dust with remarkable efficiency. Self-cleaning, boasting a high recovery rate, devoid of moving parts (and so requiring no maintenance!), SPA is available at a keenly competitive price.

And Steels produce other types of extraction equipment, too; cyclones (low pressure drop and high efficiency) and both manual and fully automatic fabric filters. All suitable for a variety of industrial applications.
But contact us for the *FULL* story.

**Selective Particle Acceleration, the principle by which the SPA centrifugal dust collector achieves its end, progressively removes dust particles according to size before they can cause abrasion. Hence, Higher collection efficiency, Lower power consumption, Longer life.*

SPA

DUST EXTRACTION

SPA IS A PRODUCT OF THE GAS CLEANING DIVISION OF
STEELS ENGINEERING INSTALLATIONS LIMITED
SUNDERLAND & BIRMINGHAM. 886.

A2

Available from Stock!

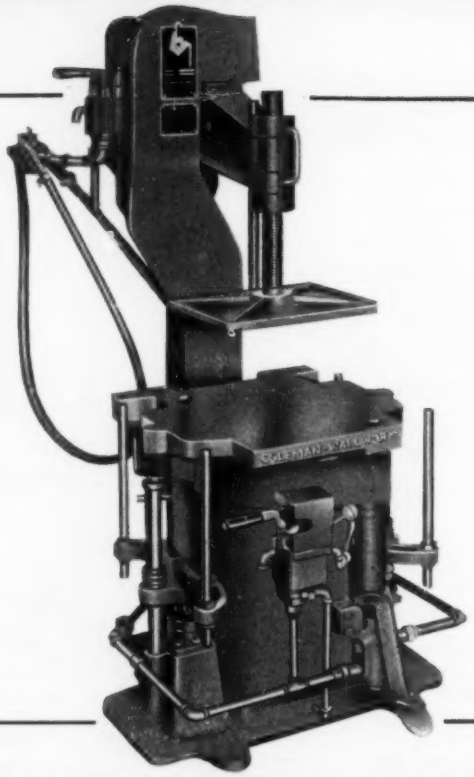
SIMULTANEOUS SHOCKLESS JOLT SQUEEZE STRAIGHT DRAW MOULDING MACHINES

WT 563

This machine is the most versatile of its kind for general foundry work and the most popular throughout the foundry industry. The table size of 22¼" x 19" will accommodate a wide range of small and medium size moulding boxes and the adjustable presser head allows for varying depths of boxes to be used. Pattern plates can be changed with ease. Useful load 300 lbs.

WT563C

This machine, with its table size of 35" x 24" and useful load of 800 lbs., has all the advantages of the WT.563 machine plus a larger capacity. A wide range of moulding boxes and pattern plates can be accommodated and boxes of varying depths utilized. Pattern-plate change is simple and rapid.

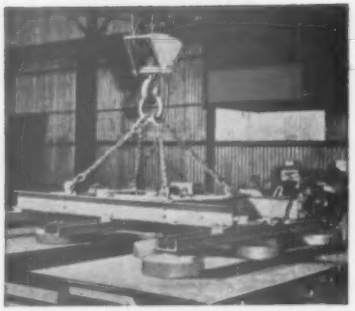


STONE PLATT GROUP

THE COLEMAN-WALLWORK FOUNDRY EQUIPMENT DIVISION OF STONE-WALLWORK LIMITED

32 VICTORIA STREET, LONDON, S.W.1 Telephone: ABBey 7681

There are Witton-Kramer lifting magnets of all types to help you reduce your handling costs. Modern design and robust construction ensure their long life under severe operating conditions. That is why so many are being supplied for such a variety of duties.



A group of lifting magnets at the Manor Works of Joseph Sankey & Sons handling plates for the magnet yoke of a 7000 MeV proton-synchrotron.

Lifting pig iron at Round Oak Steelworks Ltd.

Lifting four ingots at the works of Taylor Brothers & Co. Ltd., Trafford Park. The total lift is about 13,440 lbs.

RELY ON THE EXPERIENCE OF G.E.C.

THE GENERAL ELECTRIC CO LTD OF ENGLAND · WITTON-KRAMER DIVISION · BIRMINGHAM 6

389

FORDS use DOHMfrac

The new Consul Classic has components cast with DOHMfrac resin pre-coated sand

DOHMfrac is a pre-coated sand of consistent grain size giving uniform strength.

DOHMfrac can solve one of your shell moulding problems.

DOHMfrac

MELLOR MINERAL MILLS LTD.

Etruria Vale, Stoke-on-Trent. *Tel: Stoke-on-Trent 23441/5*

EVEN WE ARE AMAZED—

CASTEX*

PEAT FLOUR

—AT THE RESPONSE BY THE TRADE FOR THIS NEW PRODUCT.

Better handling facilities have been installed at Carlisle by our associates

RICHARDSON'S MOSS LITTER Co. LTD.

to cope with the demand which you, the discerning foundryman, have created.

IF YOU HAVE NOT YET TAKEN ADVANTAGE OF OUR OFFER, MAY WE RESPECTFULLY SUGGEST IN YOUR OWN INTERESTS THAT YOU WRITE TO HARBOROUGH FOR A FREE WORKING SAMPLE AND FULL PARTICULARS INCLUDING A COPY OF THE B.C.I.R.A. JOURNAL REPORT ON THIS PRODUCT.

★ REGISTERED TRADE NAME

HARMARK FOUNDRY SUPPLIES

MANUFACTURED BY

HARBOROUGH CONSTRUCTION CO·LTD·MARKET HARBOROUGH

This advertisement has been produced in association with Richardson's Moss Litter Co. Ltd. of Carlisle.

BILSTON

Rolled Steel MOULDING BOXES

Interchangeable · Accurately jigged and reamed. Withstand rough handling. Long life without distortion. Sizes and shapes to requirements.

BILSTON STOVE & STEEL TRUCK CO. LIMITED
BILSTON • Phone: BILSTON 41921 • STAFFS

• Agents for Southern England

FOUNDRY SUPPLIERS LIMITED.
25A, Cockspur St., London, S.W.1 'Phone: TRAfalgar 1141

PELLETED FOUNDRY PITCH

BRITISH PATENT NO. 632734

Sole Manufacturers

THE MIDLAND TAR DISTILLERS LTD.

OLDBURY BIRMINGHAM

TELEPHONE: BROADWELL 1661

NO. 10 PREPARED BLACKING

PHŒNIX

BLACKING or PLUMBAGO MIXTURE for the CO_2 process

STEELMOL *for STEEL and SPECIAL IRON CASTINGS*

HIGH CARBON BLACKING · CEYLON PLUMBAGO
TERRA FLAKE · COAL DUST · SYNTHETIC GRAPHITE
AND "ALUMISH" FOR ALUMINIUM
Non-Silica PARTING POWDER

JAMES DURRANS & SONS LTD

PHŒNIX WORKS & PLUMPTON MILLS PENISTONE near SHEFFIELD
Telephone : PENISTONE 3121 and 3122 *Telegrams* : BLACKING, PENISTONE

A3

TITAN
FOUNDRY PLANT

THE PAST - CONSTRUCTIONAL have supplied Cupolas under the "TITAN" trade mark to all parts of the world.

THE PRESENT - CONSTRUCTIONAL are supplying Cupolas to customers in this country and overseas, both Cold Blast and Hot Blast installations, utilising either independently fired or recuperative blast heaters.

THE FUTURE - CONSTRUCTIONAL offer a full range of Melting Plant complete with mechanised handling facilities; Cold Blast Cupolas, Hot Blast Cupolas with either independently fired or Recuperative Blast Heaters, oil fired or electric receivers.

CUPOLAS

THE CONSTRUCTIONAL ENGINEERING CO LTD

TITAN WORKS · CHARLES HENRY ST. · BIRMINGHAM 1/

PHONE MIDLAND 4753-4
GRAMS STRUCTURAL

A MEMBER OF THE B.H.D. ENGINEERS LTD. GROUP

controlled consistency

STANLEY N. EVANS

Suppliers of High Grade Moulding Sand

STANLEY N. EVANS LTD. SERPENTINE ROAD, HARBORNE, BIRMINGHAM, 17
TELEPHONE HARBORNE 0677

QUARRIES FAIRFIELD BROMSGROVE WORCESTERSHIRE

DIAMOND

Super Rapid

PLUMBAGO CRUCIBLES

1861-1961

A CENTURY OF ACHIEVEMENT

WE ENCIRCLE THE GLOBE

THE COMMON MARKET & COMMON USAGE

There is much controversy about "The Common Market" and whilst there are various viewpoints, we have decided to state ours. We are in a position to do so, as both Principal and Agent have been established for a Century, which is a perfect combination. We do not fear the "Market", nor are we at "Sixes and Sevens"—we are more interested in "Common Usage" and to prove to you our commodities come within that category, based on PRICE, PERFORMANCE and OVERALL ECONOMY.

SOLE AGENTS FOR THE U.K.

THE WILSON CRUCIBLE COMPANY, LTD.

16, Philpot Lane · London, E.C.3. · *Tel.:* MANsion House 8138/9

ASSOCIATED WITH T. S. WILSON & COMPANY (GRAPHITE) LTD.

Wholesale Suppliers of:

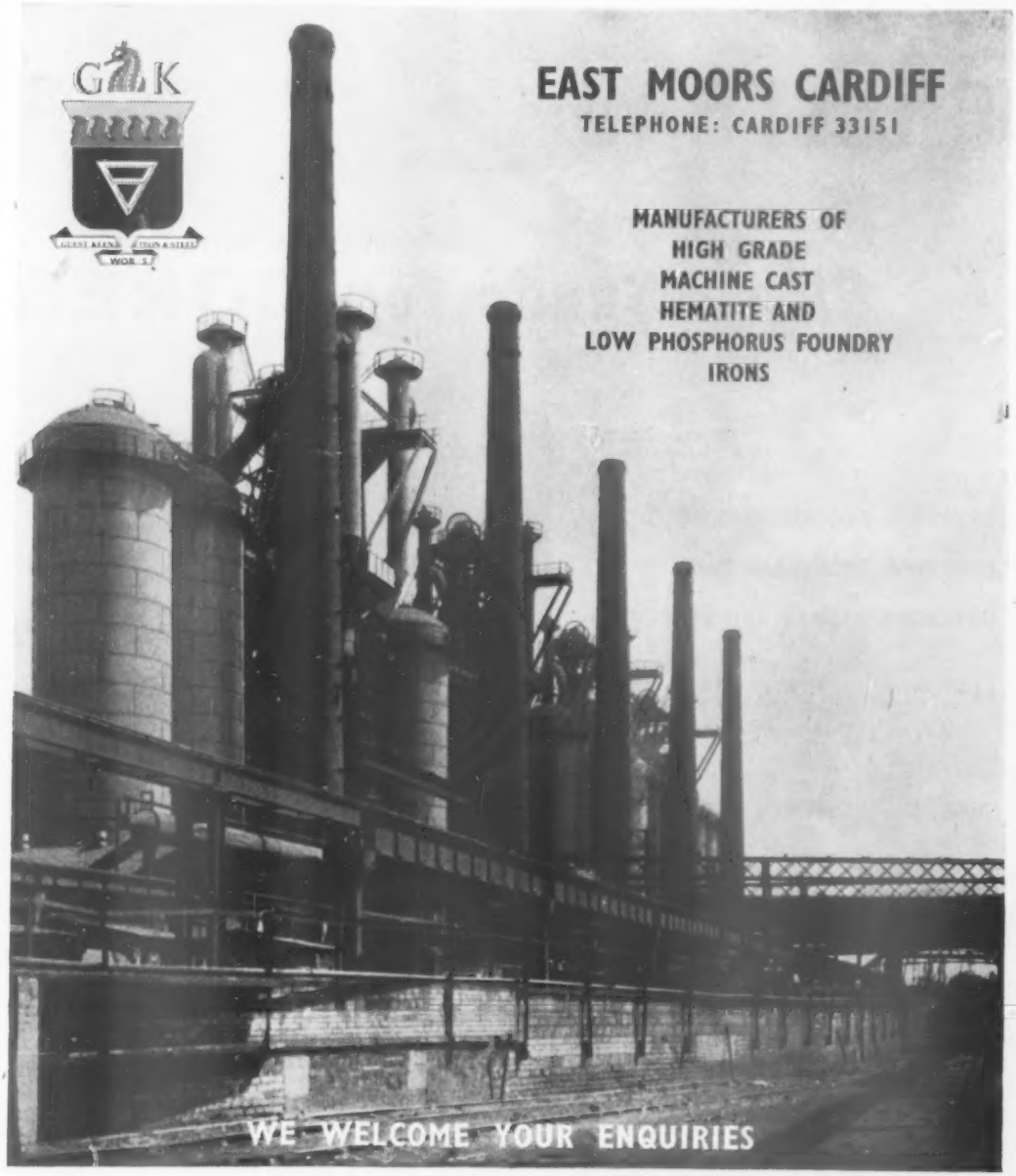
PLUMBAGO · GRAPHITE · BLACKLEAD · COLLOIDAL GRAPHITE · GRAPHITE PLATES · ETC.

GROSSALMERODER SCHMELZTIEGELWERKE **BECKER & PISCANTOR** GROSSALMERODE WESTDEUTSCHLAND

DIAMOND

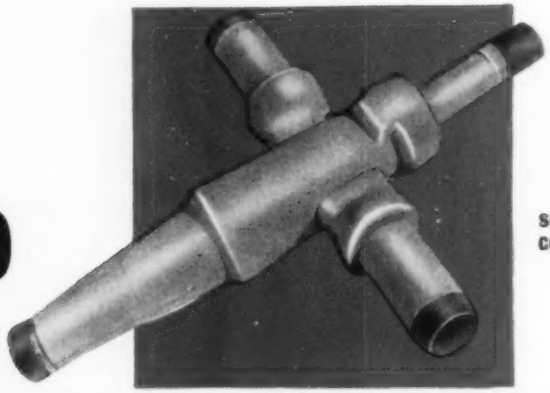
GUEST KEEN IRON & STEEL WORKS

(Branch of G.K.N. Steel Company Limited)



A FREE METALLURGICAL SERVICE IS AVAILABLE AND YOU ARE INVITED TO CONSULT US ON ANY FOUNDRY PROBLEMS

CHELFORD



SHELL CORE

Silica Sands for CORES

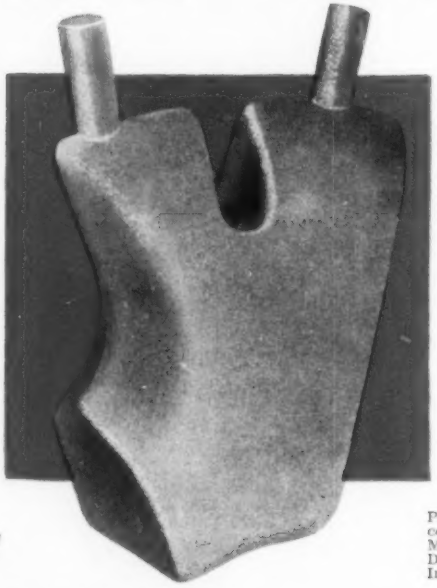
Produced at one of Britain's finest and most up-to-date plants, these sands are available in three grades.

CHELFORD PROCESSED COARSE

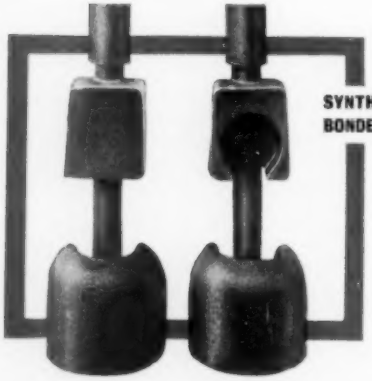
CHELFORD PROCESSED FINE

CHELFORD WASHED AND SCREENED

Sands from the Hydrosizers are clay free and correctly graded to meet the most exacting demands of the user.



CO_2 CORE



SYNTHETICALLY BONDED CORE

Photographs by courtesy of Messrs. David Brown Industries Ltd.

B.S.I. GRADINGS

CHELFORD PROCESSED COARSE:	Approx. Range 30-85 low in minus 100's
CHELFORD PROCESSED FINE:	Approx. Range 60-150
CHELFORD WASHED AND SCREENED:	Approx. Range 22-150

Full particulars and recommendations for the use of Chelford and other sands in the G.R. range will gladly be sent on request.

GR

The GENEFAX GROUP for everything in Refractories

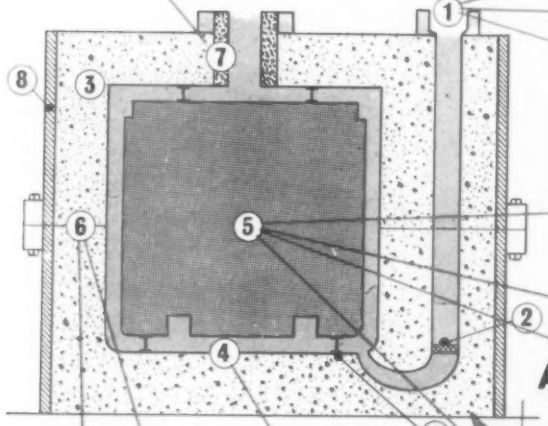
GENERAL REFRACTORIES LTD

GENEFAX HOUSE · SHEFFIELD 10 · Tel: 31113 (6 lines)

446

The Only Complete SERVICE TO THE FOUNDRY

ALICO
CUPRO
ALINOR
ALSICA
CODEGA
PURIC
CODEOX
CRULIN
ATMOSOL
CRUDOL
CRUDEX
BEECRO
BEECROL
SILVERSKIN



Key to Sectional Drawing of Mould

		Send for booklet No
1	Metallurgical Control use of Fluxes	3
2	Clean Metal by using Ceramic Strainer Cores and Discs.	4
3	Coal Dust additional to Facing and Backing Sand	1
4	Silverskin Blackings, Plumbago and Mould Dressings.	1
5	Cores using Crulin and Crudol Core Binders (Oil Bonded, Air Setting Cereal or CO_2 Binders).	2
6	Moulds Parted with Beecro Silica Free Parting Powder or Beecrol Parting Liquid.	1
7	Casting Feeding with Alsica Exothermic Feeder Heads.	4
8	Moulding Boxes supplied by B.F.U. }	5
9	Chaplets, Studs, etc. }	

is provided by—

BRITISH FOUNDRY UNITS LTD.,

Sole Agents for The Vortec Foundry Machines.

FOR THE ONLY COMPLETE SERVICE TO THE FOUNDRY

RETORT WORKS CHESTERFIELD

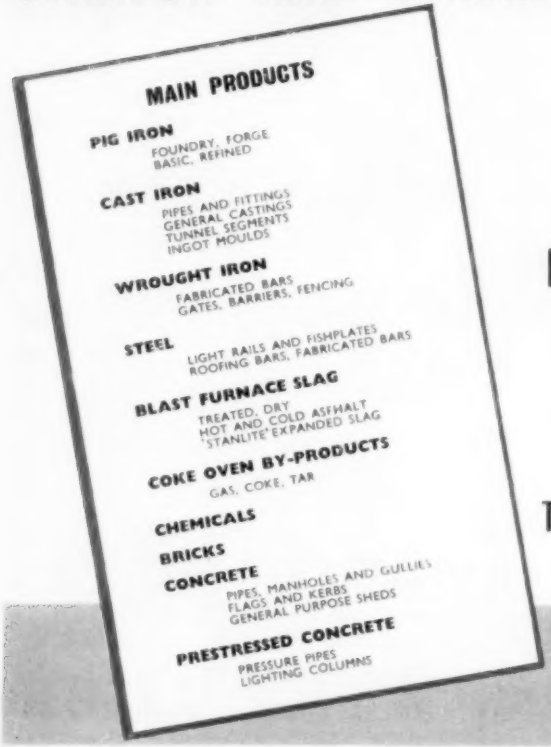
Telephone : 4157/8 Telegrams : "RETORT"

THE STANTON IRONWORKS COMPANY LIMITED

THE STAVELEY IRON & CHEMICAL COMPANY LIMITED

commencing 1st July, 1961

STANTON AND STAVELEY SALES LIMITED

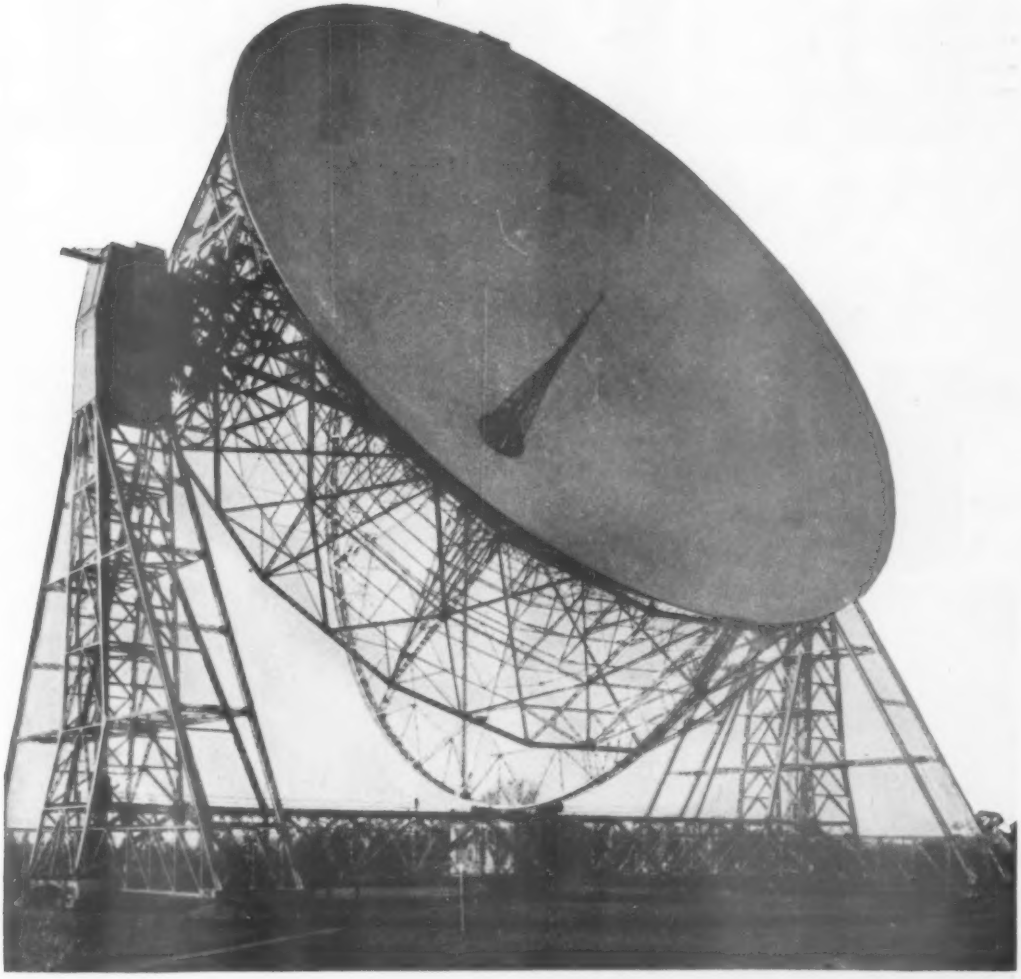


HEAD OFFICE:

NEAR NOTTINGHAM

P.O. BOX 72

Telephone: Ilkeston 2121



"I THOUGHT I HEARD SOMETHING!"

You did, and it doesn't require a detector as sensitive as this vast radio telescope to hear that many foundrymen and metallurgists rely upon us for their supply of special refined pig irons.

BRADLEY & FOSTER LIMITED

FOR QUALITY CONTROLLED REFINED PIG IRON

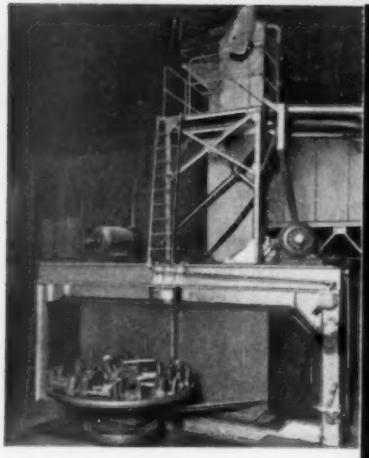
DARLASTON · STAFFORDSHIRE

Telephone: JAMes Bridge 2353 (7 lines) Telegrams: BRADLEY DARLASTON

BIG SHOTS IN HISTORY
500 years ago "Mons Meg" made history as one of the most advanced cannons of its day . . .

1461

1961



Dual Swing Table Wheelabrator Plant using Wheelabrator Steel Shot

. . . Today Tilghmans are making history with Dual Swing Table Wheelabrator Plants using Wheelabrator Steel Shot.
Illustrated above is a 6ft. plant installed at Jarrow Metal Industries Ltd., engaged in cleaning a miscellaneous load of steel castings and the cleaning cycle is eight minutes. This type of plant enables one table to be unloaded and reloaded whilst the other table is under the blast stream, and each table is capable of carrying two tons.

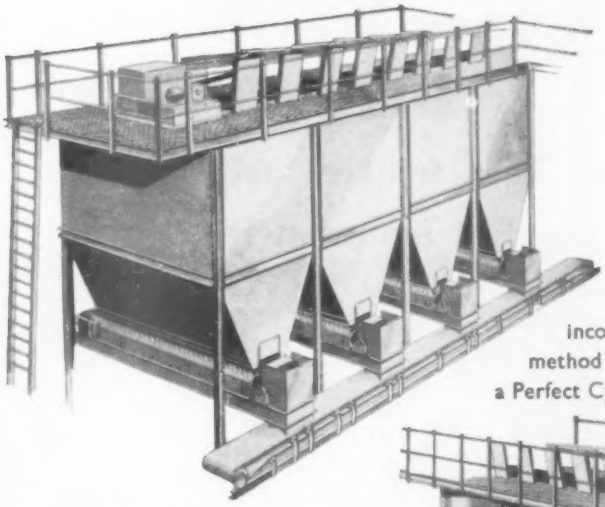
TILGHMAN'S
STAVELEY GROUP

BROADHEATH, ALTRINCHAM, CHESHIRE
London Office: 1, Chester St., S.W.1.
TAYSON 7508

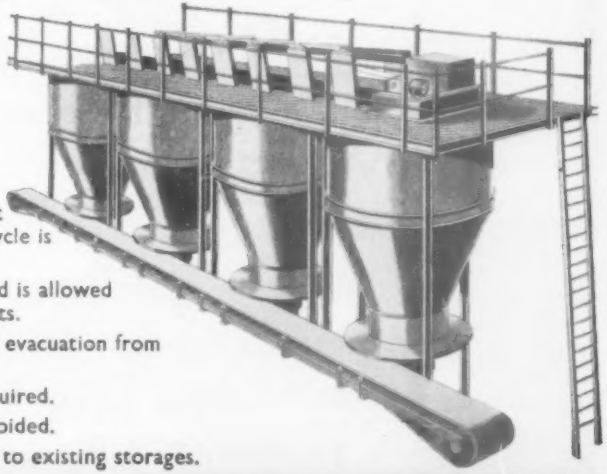
FOUMEC

AT LONG LAST!...YES!

SAND STORAGE AT ITS BEST



The Mechanised Plants we supply incorporate the ONLY 100 per cent. efficient method of ensuring the use of Returned Sand in a Perfect Cycle.



- No 'Piping' or 'Bridging' inside Hoppers.
- No Overheating of Sand.
- Sand newly returned from Shake-Out is not allowed to be re-used until cycle is complete.
- Moisture remaining in returned sand is allowed to even itself within hopper contents.
- No labour is required to assist sand evacuation from hoppers.
- Ideal when large sand storage is required.
- Essential when hot sand must be avoided.
- Consult us for adaptation of system to existing storages.

FOUNDRY MECHANISATIONS (BAILLOT) LTD.

Main Offices & Works: **DENBIGH ROAD, BLETCHLEY, BUCKS.**

Tel.: BLETCHLEY 3354 *Regd. Office:* 29, CROMWELL ROAD, LONDON, S.W.7. *Grams:* "FOUMEC" BLETCHLEY

F.M.1

*NOW AVAILABLE FROM STOCK

All prepublication orders for the 1960/1 EDITION of

RYLAND'S DIRECTORY

have now been fulfilled, and copies can be supplied immediately from stock

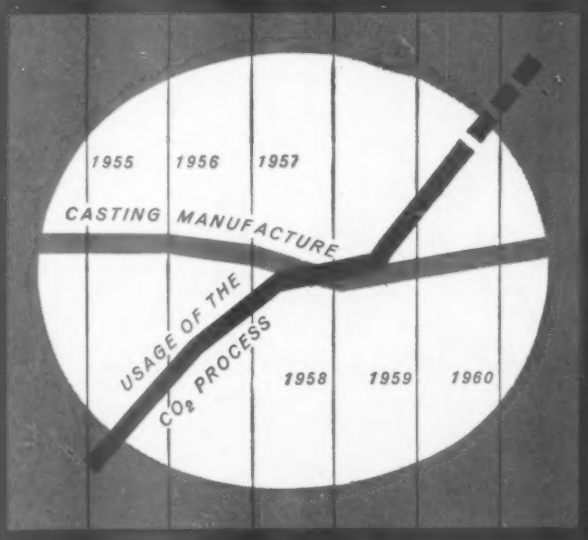
May we suggest you place your order at once with

The Publisher,
Ryland's Directory,
17/19 John Adam St.,
London, W.C.2

Price
84/-
(Post free in the U.K.)

HARD AND FAST FACTS

why casting by the CO_2 process has increased sixfold in five years



The steep rise of the graph proves it—the number of castings produced by the CO_2/sodium silicate process has multiplied six times in five years. Here—hard and fast—are the facts why:

1

Simplicity—One unit sand is used throughout for all sizes of cores and moulds, cutting out complex sand mixing and testing. Sand bonding by CO_2 gassing is simpler, quicker, cleaner and surer and eliminates stove drying.

2

Economy—Savings in materials, fuel, equipment, maintenance and handling costs are substantial and the work content of cores and moulds greatly reduced.

3

Productivity—Casting yields have been doubled with the same floor space. Fewer moulding boxes are needed and turn-round is stepped up. Production becomes flexible, while less fumes and dust improve working conditions.

4

Quality Control—Without stoving, core and mould bonding is accurately controlled. Defective castings are drastically down, dimensional accuracy up and surface finish improved.

For full details of the process that is revolutionising foundry practice everywhere, write to:

THE DISTILLERS COMPANY LIMITED · CHEMICAL DIVISION

Carbon Dioxide Dept. (CD) Devonshire House, Mayfair Place, Piccadilly, London, W.1.
Telephone: MAYfair 8867.

Sales Offices: Southern Area: Broadway House, The Broadway, Wimbledon SW19. LIBerty 4661. Northern Area: Queen's House, Queen Street, Manchester 2. Deansgate 8877.

DCL

C2

TA 4975

HEDIN

Electric ALUMINIUM MELTING FURNACES

(bale-out or tilting) cut running costs

to say nothing of being cleaner and easier to work with

This is how—

- You have much closer control of your heat. You can go up to melting point and stop there. There is no need to waste heat beyond that point. This results in minimum losses in volatilisation.
- Electrically heated crucibles have a longer life due to the absence of flame impingement.
- The furnace is clean to work with, of very simple construction, and requires little or no maintenance.
- The elements are arranged for rapid heating, and can be easily displaced without dismantling the brickwork.
- A throughput of 120 lb. of aluminium per hour can be obtained with the AMF.4 (300lb. capacity).

SIZES: 50lb., 100lb., 200lb., 300lb. & 1000lb. capacity. Other sizes gladly built to order.

Hedin aluminium bale-out furnace. Tilting type also available.

THE HEDIN RANGE OF FURNACES

Aluminium Brazing, continuous or batch : Sintering, to suit all temperatures : Continuous or batch annealing, with or without atmospheres : Forced Air Circulating : Steam atmosphere, arranged for rapid quenching : Special tungsten furnaces up to 2,500 deg. C. : Glass annealing lehrs, continuous or batch : Ceramic Kilns up to 1,400 deg. C., tunnel or batch : Carbon resistor furnaces up to 3,000 deg. C.

We shall be glad to send you full details of any of our furnaces on request.

HEDIN LIMITED
INDUSTRIAL HEATING SPECIALISTS
FOWLER ROAD
HAINAULT, ESSEX
HAInault 3031

WILLIAM CUMMING & CO. LTD.

KELVINVALE MILLS
GLASGOW N.W.

•

SUNNYSIDE MILLS
FALKIRK

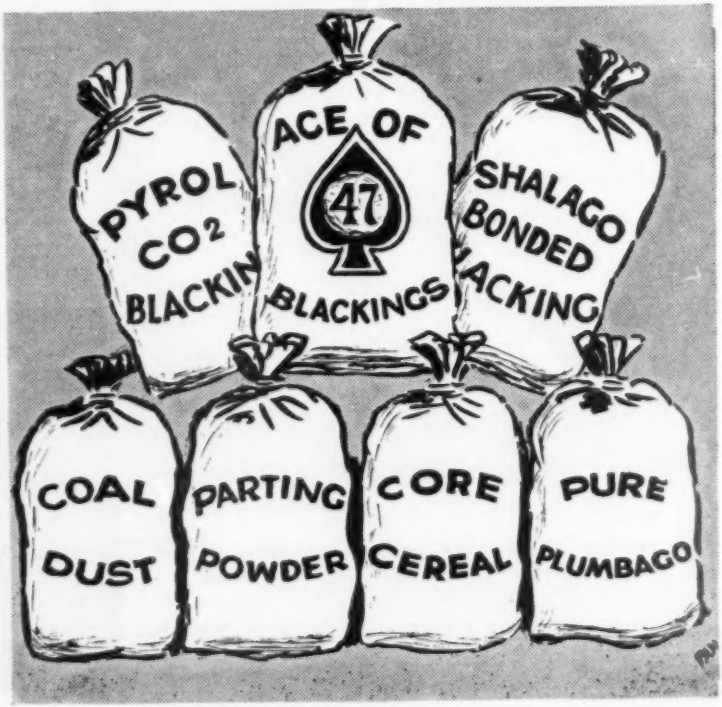
•

WHITTINGTON MILLS
CHESTERFIELD

•

DEEPFIELDS WORKS
near BILSTON

FREE TRIALS

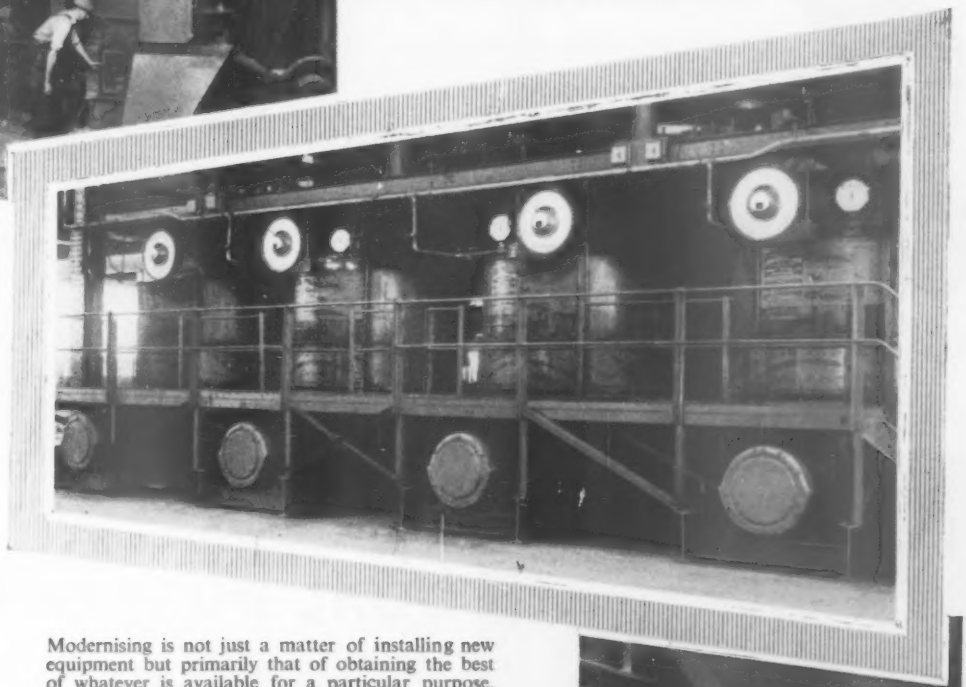


More and more modern foundries

are specifying the

*SPEED*MULLOR

to mull their mould or core sand



Modernising is not just a matter of installing new equipment but primarily that of obtaining the best of whatever is available for a particular purpose. That is why more and more modern foundries choose the Speedmullor for the preparation of their sand. One single foundry in this country operates 10 Speedmullors and one multiple company uses 14. More foundry sand is mulled in Speedmullors than by any other method because, only Speedmullor mulling can develop the full physical properties of moulding sand and core sand mixtures with minimum bond and at lowest cost per ton of sand mulled. Full development of physical properties with maximum Speedmullor uniformity and control provides higher quality castings with better surface finish and the elimination of casting defects.

Made under licence from

BEARDSLEY & PIPER, CHICAGO

by

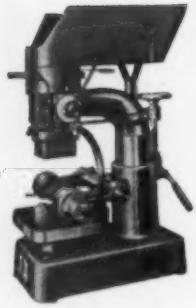
HERBERT MORRIS LIMITED

P.O. BOX 7

LOUGHBOROUGH ENGLAND

HANSBERG Coreshooters

For Denser Cores and Faster Production

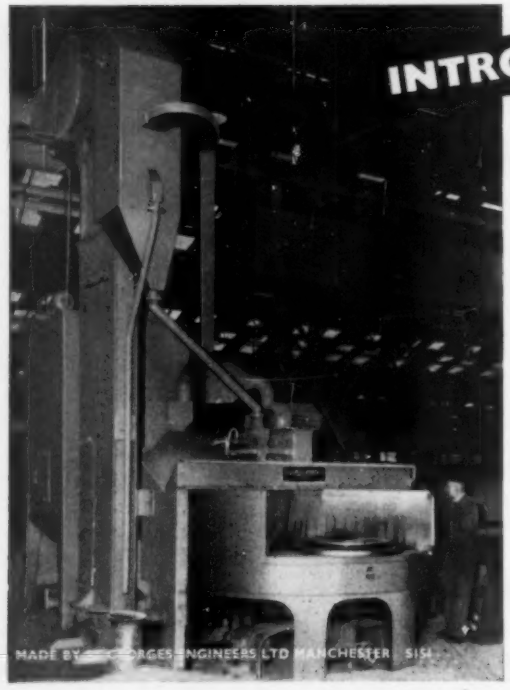


TYPE H 2lbs.

Extended core box life.
Minimum venting problems.
Minimum air consumption.

ROY EVANS M.I.B.F.
(Coreshooters Sales Ltd.)
44, PRESTBURY RD., CHELTENHAM.
Telephone: CHELTENHAM 55105.
Patented and Mfd. by Off. Mecc. FRITZ HANSBURG Modena. Italy.

H5A, H12A, H25A, H80,
17-260lbs.
Automatic Oil-pneumatic



INTRODUCING

THE NEW

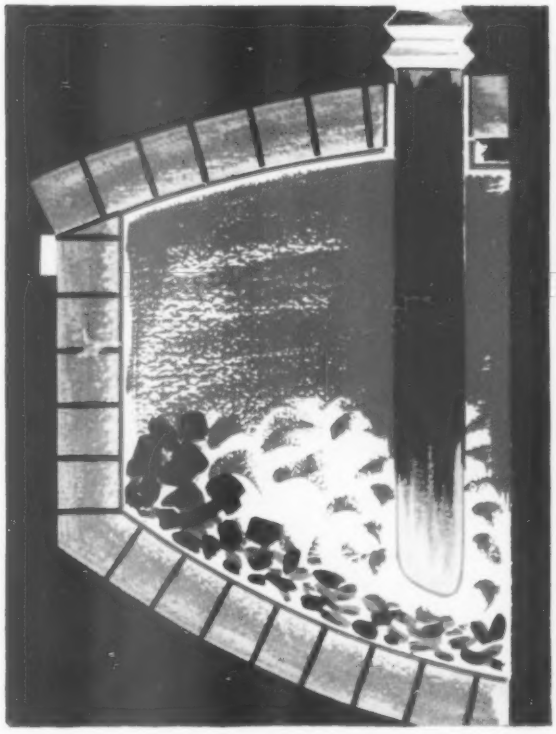
DUAL PURPOSE
WHEELBLAST TURNTABLE
SHOT BLAST PLANT

This new machine combines all the advantages of the DUAL-TABLE and ROTARY-TABLE type plants. With the auxiliary tables in position the machine is ideally suited to quantity production, being particularly useful for cleaning complicated or fragile pieces, with difficult, deep pockets.

With the auxiliary tables removed—(the work of a few minutes) the plant becomes a Rotary Table type—a valuable general purpose machine for the cleaning of shallow or flat parts.

NO LIMIT TO SIZE

ST. GEORGES ENGINEERS LIMITED
ORDSALL LANE MANCHESTER 5
Phone: TRAfford Park 1207 (4 lines) Grams: 'Georgic' Manchester 5



why ACHESON TRADE MARK graphite electrodes

Give You Dependable Service!

"Acheson" Graphite Electrodes are manufactured from specially selected high grade raw materials which are carefully processed at all stages of manufacture under controlled conditions to give a final electrode for your arc furnaces with these properties at their optimum—

LOW RESISTANCE

HIGH MECHANICAL STRENGTH AT OPERATING TEMPERATURES

EXCEPTIONAL THERMAL SHOCK RESISTANCE

"Acheson" Graphite Electrodes are made in the United Kingdom only by

BRITISH ACHESON ELECTRODES LIMITED of SHEFFIELD.

ACHESON
TRADE MARK

GRAPHITE ELECTRODES

The term ACHESON is a registered trade mark

B

IT'S ALL AUTOMATIC . . .

ENGLISH STEEL CASTINGS CORPORATION LTD.

GRIMESTHORPE WORKS
SHEFFIELD 9

We have been privileged to design and supply a 60 ton per hour Sand Conditioning and Distribution Plant to this famous Steel Foundry.

Plant incorporates 2 large Batch Sand Mills with the latest automatic weighing equipment for sand and additions (Bentonite delivered by tubular flight conveyor).

We can now offer what we believe to be the most advanced batch weighing system in the country — for easy mix, easy output, select your weighments: set a dial and press a button — it's all automatic!

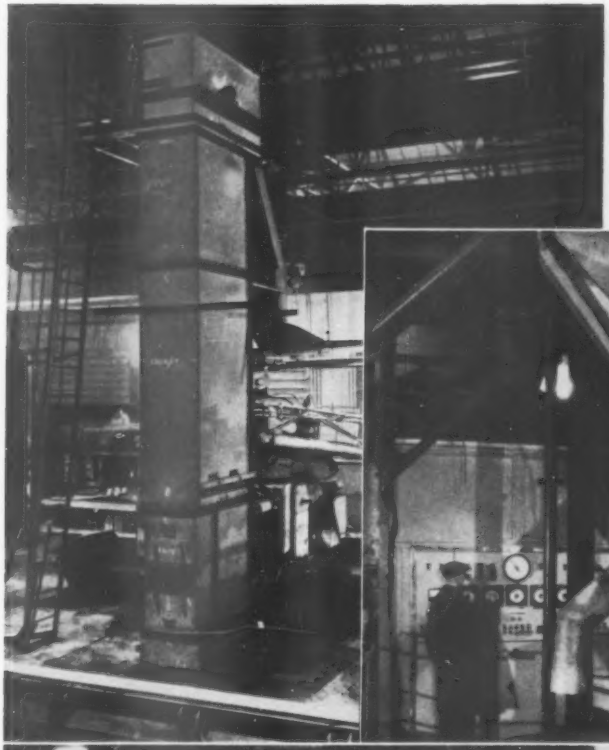
All Photographs reproduced by courtesy of English Steel Castings Corporation Ltd.

FOUNDRY EQUIPMENT LIMITED

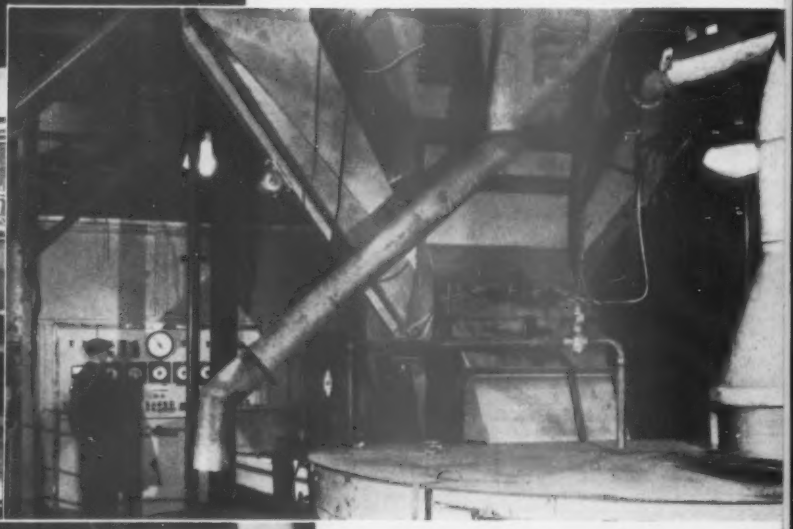
Leighton Buzzard, Bedfordshire, England

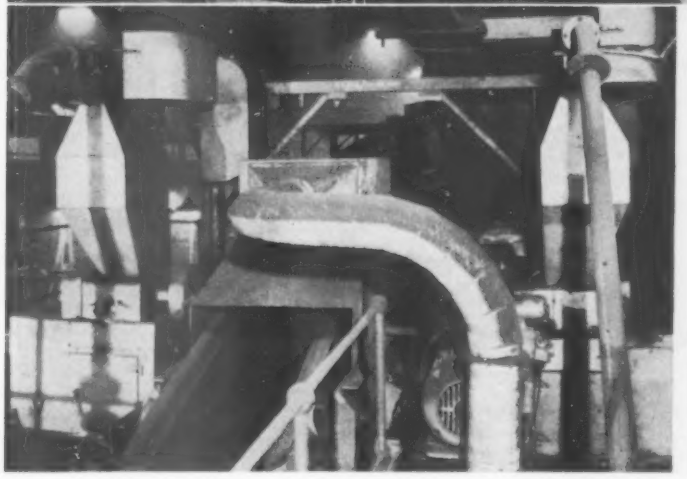
Telephone: Leighton Buzzard 2441 (5 lines) **Telegrams: 'Equipment,' Leighton Buzzard, England**

WEIGHING, BATCH FEEDING, MILLING, DISCHARGE, RESET



High precision weigh control for accuracy of mix, consistent sand quality and highest quality castings.





*

'English Steel' buy the best, how about you?

OVERSEAS COMPANIES:

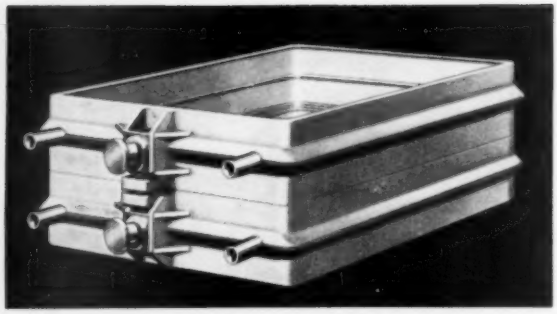
AUSTRALIA: Foundry Equipment (Australia) Pty. Ltd., Elizabeth, S. Australia.
CANADA & U.S.A.: F. E. (North America) Ltd., Toronto.
SOUTH AFRICA: F. E. (South Africa) (Pty) Ltd., Johannesburg.
SPAIN: "Foundry Equipment" Comercial Espanola, S.A., Madrid.

AGENTS IN ALL INDUSTRIAL COUNTRIES

FE
FOR FOUNDRY EFFICIENCY
TRADE MARK

The Highest Quality—
The Best Design

at the lowest possible price commensurate with both



Sooner or later you will invest in Sterling moulding boxes because Sterling give you what you want. It is always possible to buy something a little cheaper but experience teaches that the best is the cheapest in the long run and there is no doubt that Sterling boxes are the best. Sterling were in the forefront fifty years ago. Fifty years of effort have maintained them there. Sterling keep ahead of the job, like only a leader can.

★ *Sterling have technical staff always available to discuss the best box for your particular needs, and this Sterling service is world-wide. Sterling representatives will be pleased to call at your request.*

Sterling Boxes are Light, Accurate, Durable, Strong and Interchangeable. They are made in a wide range of sizes from 9ins. square to anything up to around 14ft. in width to around 27ft. in length for special requirements.
Sterling boxes are made for bench moulding of the simplest kind to the most highly mechanised foundries using the latest automatic machines. They are made for lightly rammed boxes, to boxes used on the latest type of very high pressure moulding machines.

Illustration shows model style 'SLT'

Sterling

MANUFACTURERS OF BETTER MOULDING BOXES

STERLING FOUNDRY SPECIALTIES LTD., BEDFORD, ENGLAND.

593 Cogent

FOUNDRY TRADE JOURNAL

Vol. 110 June 29, 1961 No. 2325

Established 1902

Incorporating
IRON & STEEL TRADES JOURNAL

Published each Thursday

Annual subscription: *United Kingdom* 52*s.*
Abroad 60*s.* *Payable in advance*

Editorial Director:
V. C. FAULKNER, F.R.S.A., HON.M.I.B.F.

Editor:
A. R. PARKES, M.I.B.F.

Commercial Editor:
R. M. HOWSE

Production Manager:
R. J. LOVELL

Publisher: H. J. DWYER
Circulation Manager: E. T. GRIFFITHS

District Representatives:
G. P. ELLIOTT (Northern Area) 'phone: Altrincham 1334
T. H. SMITH (Scotland) 'phone: Dumbarton 1046
D. C. RYALL (Southern Area) 'phone: TRAfalgar 6171

The FOUNDRY TRADE JOURNAL is the official organ of the British Steel Founders' Association; Association of Bronze & Brass Founders; the Light Metal Founders Association; Foundry Trades' Equipment & Supplies Association; and the National Society of Master Patternmakers.

AN INDUSTRIAL NEWSPAPERS PUBLICATION

Published by
INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL) LTD.

Directors:
F. BARRINGTON HOOPER, B.A., *Managing*
F. H. HARLEY
JOHN HOOPER
V. C. FAULKNER
E. G. WESTON, *Secretary*

JOHN ADAM HOUSE,
17-19, JOHN ADAM STREET,
ADELPHI, LONDON, W.C.2

Telephone: Trafalgar 6171 (*Private Branch Exchange*)
Telegraphic Address: "Zacatecas, Rand, London."

PRINCIPAL CONTENTS

PAGE

CO_2 Process and Die-casting in Brazil

By D. C. Nevin, A.M.I.Mech.E., A.M.I.B.F.

Introduction of new techniques into a Latin American foundry .. 821

Cupola Operating Data

By "Tubal Cain"

The Author explains how to go about operating a cupola assuming no prior knowledge on the part of the reader 833

Le procédé au CO_2 et le moulage en coquille et sous pression au Brésil. Par D. C. Nevin, A.M.I.Mech.E., A.M.I.B.F.
Introduction de nouvelles techniques dans une fonderie d'Amérique latine 821

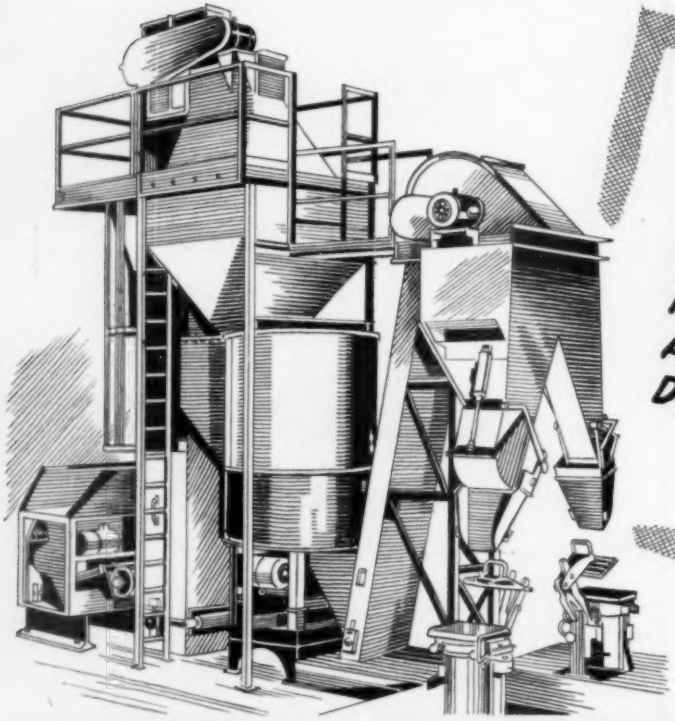
Données sur la marche du cubilot. Par "Tubal Cain."
L'auteur explique comment s'y prendre pour fair marcher un cubilot, en prétendant que le lecteur n'en a aucune connaissance. 833

Kohlensäure-erstarrungsverfahren und Kokillen—und Druckgiess—methoden in Brasilien. Von D. C. Nevin, A.M.I.Mech.E., A.M.I.B.F.
Einführung neuer Verfahrensweisen in einer lateinamerikanischen Giesserei. 821

Betriebsunterlagen für den Kupolofen. Von "Tubal Cain."
Der Verfasser erklärt, wie man einen Kupolofen zu führen hat, wobei er keinerlei Kenntnisse des Lesers voraussetzt. 833

Features, News, Commercial Information, and Statistics

Leader: Iron and Steel Board Report and the Founding Industry .. 819
Foundry Art and Craft Exhibition 820
Exporting to Germany 820
Aluminium Industry's Golf Meeting 820
Revival in Industry 832
Pressure-die-casting grows in Europe 832
Medical Service for Small Firms 832
Equipment and Supplies 834
Iron Castings Production in 1960 835
American Letter 837
Personal 838
Translation Service 839
News in Brief 840
Gap in Management Training 841
Lodge-Cottrell Contract 842
Falkirk Foundry Expansion 842
43-year Presentation 842
Publications Received 843
Company News 844
Raw Material Markets 846
Current Prices of Iron, Steel, and Non-ferrous Metals 848
Imports and Exports of Iron and Steel in April 850



SCREENING
ELEVATING
STORING
BATCHING
PREPARING
AERATING
DELIVERY

Sand Control in Minimum Space

COMPOSITE SAND PLANT

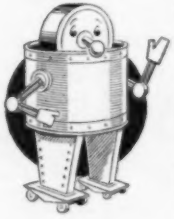
incorporating

AUGUST NATIONAL SCREEN MASTER

AUGUST-SIMPSON MIX-MULLER

and AUGUST NATIONAL ELEVAYOR

This equipment can be arranged with a Bucket Loader directly charging the August-Simpson Mix-Muller, thus eliminating the Elevator, Storage Hopper, and Batch Measuring Unit.



Sole Licensees and Manufacturers for the British Empire (excluding Canada, Australia and New Zealand) of the Simpson Sand Mixer.

HALIFAX
ENGLAND

August's LIMITED

TELEPHONE:
HALIFAX 61245/6/7/8
TELEGRAMS:
AUGUST, HALIFAX

FOUNDRY
TRADE JOURNAL
Vol. 110 June 29, 1961 No. 2325

Iron and Steel Board Report and the Founding Industry

There is much more space devoted to the founding industry in the 1960 Annual Report,* issued last week by the Iron and Steel Board, than has hitherto been the case. The heading " Abrasives and Unclassified " in Table 1 of the Report, printed elsewhere in this issue, may intrigue some readers, but as chilled cast-iron grit is made in large quantities it enters into the category of iron castings. This, however, does not account for the whole of the entry and the remainder must be left to the imagination; after all, 200,000 tons is quite a large figure. A warning is given in the Report that the production of ingot moulds was last year out of step with steel production. However, the excess moulds made might in some small measure be due to the demand from the non-ferrous industries. The foundry equipment industry can take heart that the capital expenditure by the foundry industry of about £9,000,000 in 1960 is expected to continue to rise this year.

The iron foundries are tending to use more steel scrap in their cupola charges the percentage having risen from 9·6 to 9·9. The use of hot-blast cupolas favours the increase, but the main factor is economics. Scrap from the dismantled textile factories ensured good supplies during the year. When the increases in coal prices were announced last September, we commented that this was not a simple addition to manufacturing costs but a multiplication. Now the Iron and Steel Board reveals this is an additional burden to the founding industry of 4s. 9d. per ton of castings produced (approximately £1,000,000 a year), but this ignores the multiplication factors of dearer pig-iron, and higher gas, electricity and transport costs which follow in the wake of increased coal and coke prices. It is sometimes forgotten that to make four million tons of castings about 5¾ million tons of metal has to be melted requiring 850,000 tons of coke.

It is pleasing to note that the Report takes recognizance of the important work being done by the Training Committee of the Council of Ironfoundry Associations. This work was recently ignored in a report emanating from a very important source. The work of this Association's Health and Safety Committee is also detailed. The Report comments on the £350,000 spent by the British Cast Iron Research Association and the £200,000 spent by the British Steel Castings Research Association and says that " this help is most marked . . . because the foundry industries comprise many firms not big enough to maintain their own research departments." This is a fact, the rider to which is that the smaller concerns should use such facilities to an increasing extent.

---

* Published by H.M. Stationery Office, York House, Kingsway, London, W.C.2; price 5s., postage 4d.

Foundry Art and Craft Exhibition

A Foundry Art and Craft Exhibition was staged in the Great Hall of the University of Birmingham, organized by the Department of Industrial Metallurgy, on June 20 to 22 inclusive. The Exhibition was opened by Dr. J. G. Pearce, C.B.E., who was introduced by Professor E. C. Rollason, the Professor of Industrial Metallurgy, as a distinguished graduate of the University who had devoted a large part of his life to injecting technology into the foundry industry. Dr. Pearce reminded his audience that in the Midland area, broadly speaking, all kinds of castings were produced, and these, in tonnage, totalled nearly one-half the UK's production. The University, he said, had an historical association with the industry dating from the discovery, by its first Professor of Metallurgy, Thomas Turner, of the role of silicon in grey iron which gave birth to scientific iron-founding. Its continued interest was shown by the post-graduate course in foundry science and engineering. He illustrated the theme that the metal-casting industry has a bright future to offer, both with respect to interest and remuneration, to young men who were prepared to make their careers in it, and said that Europe, according to a recent paper by an eminent foundry metallurgist in USA, was more prolific in new ideas and developments in this field than was the USA. West European production, including the UK, of about 12,000,000 tons of castings per annum, was comparable with the production from the USA and USSR, and to this the UK contribution was about one-third.

Exhibits

The Exhibition had contributions in kind from over 80 persons, firms and associations. It covered all the metals concerned, and both domestic and engineering castings, and the section on art castings in iron, aluminium and bronze was of great interest. Illustrations were given of the work of a Canadian sculptor, Art Price of Ottawa, who, in the absence of an art casting foundry in that country, had produced a 3-ton casting, over 8-ft. high, by making his own CO_2-treated moulds. After approval of a scale model, he had carved the pieces, to serve as the pattern, from oil-sand blocks. These were then placed in a pit and embedded in sand treated with CO_2. After the pattern was withdrawn, ½ in. was removed from the surface so that the remainder could be used as a core. Some interesting recent developments such as shell moulding and the CO_2 Process were shown, and illustrative material was available on gravity- and pressure-die-casting, patternmaking and plaster moulding.

The Exhibition was of special interest to students and school parties were much in evidence in spite of the pressure of the examination season. At the stand of F. H. Lloyd & Company, Limited, they were able to mould and produce small castings in a low-melting-point alloy. Altogether the show reflected great credit on Dr. Kondic and the technician staff of his department responsible for the organization, the problems in connection with which must have been considerable. It is reported that attendance and interest aroused was very satisfactory.

PIRELLI-GENERAL, LIMITED, has placed with the General Electric Company, Limited, an order for a bell-type furnace installation for the bright annealing of copper under vacuum conditions. The charge is to be in the form of wire and strip coils or wire on spools, and the rated output will be over 250 tons per week.

Exporting to Germany

Speaking in Birmingham on June 22 to members of the Federation of British Industries, the National Union of Manufacturers and several West Midland Chambers of Commerce, Mr. N. Statham, first commercial secretary at the British Embassy in Bonn, Germany, urged Midland industrialists to explore export opportunities in West Germany. He said that whether or not Britain decided to join the Common Market, there would always be good export chances in Germany. British earnings had trebled there between 1953 and 1960 and further markets were opening as German manufacturers' and consumers' tastes became more sophisticated.

Mr. Statham offered to arrange business tours and interviews in West Germany for industrialists tackling export prospects and added that the West German "climate" for imports generally was favourable at present.

British exporters who had met German competition elsewhere and found their prices undercut were wrong, he said, in assuming it was a waste of time to try to compete with West German rivals on their own ground. Because of the German dual-price policy—making home market prices higher than those in the export market—British firms in a number of industries should seriously consider a sales drive in the West German market itself. Most West Germans were enthusiastic about the chances of Britain deciding to join the Common Market because they wanted tariffs to disappear to allow more open competition. The Germans wanted freer trade with Scandinavia and the abolition of tariffs between the Common Market and EFTA. They had a genuine fear and dislike of the economic and political division of Europe.

On the prospects for the British motor industry if Britain joined the Common Market, Mr. Statham said that while at the moment Britain had a 30 per cent. tariff against imported cars the West German tariff was only about half that. He added that among British items that were soon to be studied by special trade missions from West Germany were automatic-control equipment, domestic appliances, mechanical-handling devices, agricultural machinery and machine-tools.

Aluminium Industry's Golf Meeting

The sixteenth annual golf meeting of the aluminium industry was held at Moor Hall Park Golf Club, on June 15, when the excellent facilities, fine weather and generous hospitality of the hosts, Birmid Industries, Limited, combined to make this year's meeting a memorable event.

This year the prizes for the "Horace Clarke Cup" competition represented a departure from the usual. Play in the competition was of good standard and the winners were narrowly separated. Results were as follow:—

Horace Clarke Cup: The first prize was won by Mr. F. Whitworth (Sandwell Castings Company) with a net score of 68; the second prizewinner was Mr. J. H. Mayes (Alcan Industries, Limited), net score 69, and the third prizewinner, Mr. C. J. Midgley (J. Frankel (Aluminium), Limited), 71. *Foursome Event* (over 9 holes): (1) Mr. Whitworth and Mr. Mees e (score one-up, decided on first five holes); (2) Mr. Midgley and Mr. Millward (one-up) and (3) Mr. Gentles and Mr. Jensen (all square).

Mr. G. W. Lacey, president of the Association, presided at the dinner which followed the meeting at Penn's Hall Hotel, Sutton Coldfield.

CO_2 Process and Die-casting in Brazil

*By D. C. Nevin**
A.M.I.Mech.E.,
A.M.I.B.F.

Aerial vista of Rio de Janeiro, Brazil.

The following account describes the introduction of the CO_2 Process and pressure- and gravity-die-casting methods into the ferrous and non-ferrous foundries of the Brazilian company Rio Light S.A. and its associated company Société Anonyme du Gas. The detailed and factual form of his data does not do the Author justice for the patience and determination that must have accompanied a development of highly technical foundry processes almost from scratch.

The principal aims of this paper are: (1) To record the experiences encountered during the introduction of the CO_2 process within the Company's foundries and its application to moulds and cores covering a variety of castings used in the production and distribution of gas, and electrical power within the City of Rio de Janeiro. The qualities of the types of sands used, ambient temperature and humidity, ingredients used and the sand preparation method will be stated. A short account will be given covering the production of small blown- and hand-made-cores, air drying, the moulding of large and medium castings, the production of large and medium cores, and the use of fabricated rigs. Initially, the necessary equipment was obtained on the local market and immediately experiments went ahead. The personnel were not at once greatly enthusiastic, and, as is always with new methods, many doubts were expressed. However, training in the new technique was gradually introduced and the advantages accruing from it were eventually recognized and these doubts removed. (2) To record experiences encountered in the application of gravity- and pressure-die-casting methods to the production of parts used in the maintenance of gas meters, and castings used in the electrical distribution installations of the City of Rio de Janeiro. The gas-meter parts were formerly imported, but due to government regulations, now have to be produced within Brazil, and, consequently, the solution of this problem was a matter for the company's shops. There will be discussed the production of the dies which entailed a study to evolve methods of die-casting taking into account the limitations of plant and the fabrication of the dies in the company's tool-room from cast-iron, tool-steel, and bronze.

* The Author was assistant to chief of department, General Shops, responsible for foundries and light machine shops, Rio Light, S.A.

CO_2 PROCESS

Sand Preparation

Sand preparation of the CO_2 sand was carried out in a Beardsley & Piper 3½ cu. ft. Mulbaro, all ingredients being accurately weighed. Mulling time per batch was between two and three minutes. Three types of silica sand were used in the mixes which are outlined below. The beach sand usually contains a percentage of moisture which was removed by drying in the sun, or, in sunless weather, dried over a wood-fired brazier or by utilizing the heat from used foundry ladles after casting. These methods were used as an economy measure, thus preventing any sand-drying fuel expenses. The ingredients used for the sands were as follow: Silica-sand no. 1 (unprepared, from beach areas of Rio de Janeiro)—clay content 0.2 per cent., fineness no. 41; silica-sand no. 2 (prepared supplied by a Sao Paulo firm)—clay content,

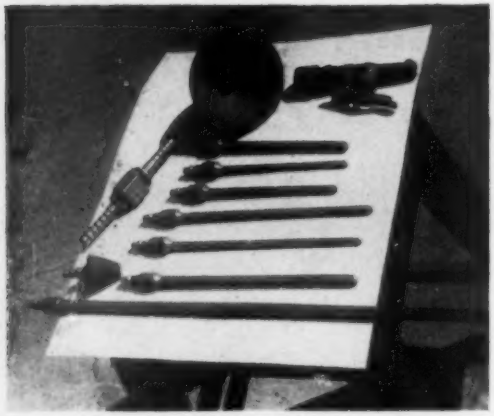


FIG. 1.—*"Kit" of injection rods, control valves and cup used in CO_2 Process at the Rio Light S.A. foundry.*

0.2 per cent., fineness no. 104; construction sand —clay content, 1.0 per cent., fineness no. 24; sodium silicate—Na_2O 16 per cent., SiO_2 35 per cent., specific gravity at 25 deg. C., 1.64; pitch; red earth from the districts around Rio de Janeiro—clay content, 62 per cent.; dextrina—the Brazilian

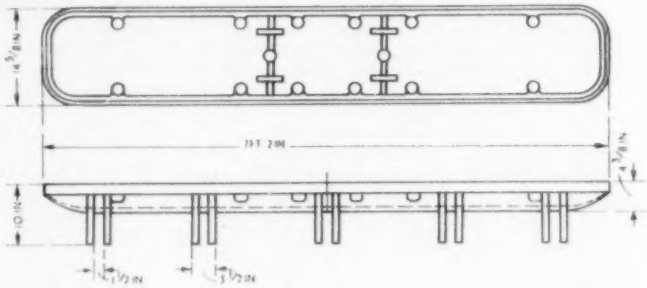


FIG. 2.—*Drawing of a gas-retort lower-door casting—one of the medium-to-large group of castings made in sets by the CO_2 Process.*

product is derived from cob corn (maize)—used to assist core breakdown; sawdust from pattern shop; alcohol for the make up of core- and mould-dressing, and graphite. Table 1 shows the mixes covering the range of work. Table 2 indicates the properties of the sands analyzed in Table 1.

Moulds and cores are dressed with the following mixture which is self igniting: Alcohol—2 litres, graphite powder—350 grammes, dextrina—300 grammes. This is applied by brush but for small cores the dipping process is resorted to.

TABLE 1.—*Sand Mixes Used.*

	A	B	C	H
	Per cent.	Per cent.	Per cent.	Per cent.
Silica sand No. 1 ..	44	—	—	47.5
Silica sand No. 2 ..	44	96.5	93.2	—
Construction sand ..	—	—	—	47
Sodium silicate ..	4	3	4	3.5
Pitch	1	—	—	—
Red earth	6.3	—	2	—
Dextrina	0.7	—	0.8	—
Graphite	—	0.5	—	—
Sawdust	—	—	—	2.0
	100	100	100	100

Key: A—medium and large moulds; B—core blowing and small hand-made cores; C—small moulds and cores; H—medium and large cores.

TABLE 2.—*Properties of Table 1 Sands (taken during the months of August/September).*

	A	B	C	H
Green compression, lb. per sq. in. ..	3.5	3.5	3.0	1.2
Dry compression ..	93.5+	93.5+	77.0	82.5
Clay, per cent. ..	4.0	2.4	3.0	2.0
Moisture, per cent. ..	2.9	0.9	1.7	2.5
Green permeability (cu. cm. per min.) ..	120	170	200	600
Dry permeability ..	110	160	180	600
Fineness number ..	45	76	81	31
Ambient temperature, deg. F.	71	68	77	77
Humidity, per cent. ..	84	87	87	87

Equipment

The equipment used (Fig. 1) is a normal reducing-valve with manometer and hose, coupled with a valve with quick-action lever-control together with quick-release adapter for use with sets of injection rods, rubber cup, or conical rubber injection pieces. The valve adapter is very convenient since outlet pressure may be selected at the bottle valve, and gas input to mould controlled by the on-and-off action of the lever control at working position.

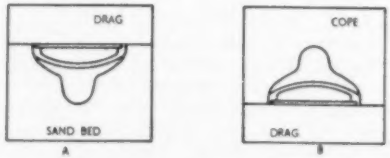


FIG. 3.—*Cross-sectional sketches illustrating the stages in the production of the mould for the lower-door depicted in Fig. 2.*

Coreblowing and Small Cores

No difficulties were encountered in the application of CO_2 sand to coreblowing or for the manual production of small cores. In some cases the taper of core-boxes required rectification, or increase, to assist removal after gassing.

The greater part of these cores were sun or air dried. The climate of Rio de Janeiro lends

FIG. 4.—*This 12-ft. casting is another heavy CO_2-produced item that works in conjunction with the lower door, a sketch of which is shown in Fig. 2.*

itself, more often than not, to the use of the sun as a drying agent for the smaller cores which gives some offset to the cost of gas. Shade temperatures of 77 deg. F. are felt with humidity figures of 87 per cent. in the month of August, which is considered as the end of the so-called winter. These temperatures rise to above 100 deg. F. in the summer with a corresponding rise in humidity. By drying within the rays of the sun, the drying time varies from a half to one hour, depending on the time of the day. For rapid use, or on sunless days, cores were gassed by means of the rubber cup or the injection rods. Great advantage was obtained in the production of the complicated cores which had previously caused difficulty on removal.

Medium and Large Castings

Gas-retort door

Fig. 2 shows the drawing of a gas-retort lower-door casting. This is one of a set of castings, usually produced in batches of 36 sets for the Societe Anonyme du Gas. These castings are used in the reconstruction of batteries of intermittent vertical retorts. The pattern was faced with sand A, followed by ramming with our normal backing sand. Gas was applied from the mould rear through channels formed in the sand by round wooden rods placed in position prior to the ramming operation. Injection was effected by means of the conical adapter (Fig. 1), the gas thus being pressure forced to the face of the mould. The procedure adopted was as follows:—

Stage 1

Prepare sand bed, ram drag, secure boxes together, rollover, remove sand bed, rap pattern, gas in suspended position, separate pattern from drag, and replace in position—this was to ensure and check freeing of pattern prior to ramming cope. This should be read in conjunction with Fig. 3A.

Stage 2

Ram cope with pattern secured by screws to rear of cope, remove cope, rollover, rap pattern (having released holding screws), gas from mould rear, remove pattern. This should be read in conjunction with Fig. 3B.

Stage 3

Apply self-igniting dressing, close cope and drag, and prepare pouring basins. The gassing time per channel was 20 seconds, these channels being spaced at intervals of approximately 8 in.

Base Casting

The casting shown in Fig. 4—cope side, is from the lower-door assembly for a battery of intermittent vertical retorts for the Societe Anonyme du Gas, and is the base casting on which the discharge door (Fig. 2) operates. Fig. 5 shows how the cope and drag were positioned and the parting line of the mould. Gassing was effected from the mould rear as for the discharge-door casting.

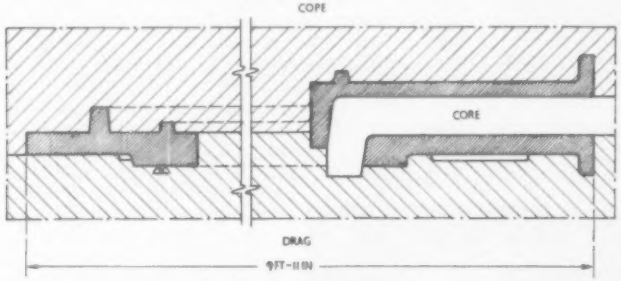


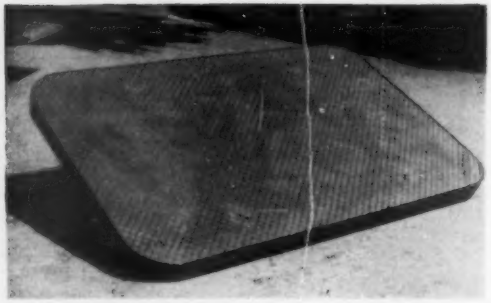
FIG. 5.—*Broken sectional-sketch of the mould set-up for the base casting—see Fig. 4—of the lower-door assembly of a gas retort.*

The moulding procedure was as follow:—

(1) Prepare greensand bed for pattern (cope side), (2) ram drag, (3) rollover, (4) remove sand bed and prepare parting face, (5) rap pattern and apply gas in suspended position, (6) position and ram cope, securing pattern to the box by bolts and plates, (7) remove cope with pattern, leaving drag in casting position, (8) rollover cope, free pattern and rap, gas, remove pattern.

Cover

A pattern of a transformer-vault cover may be seen in Figs. 6 and 7. This casting has been produced at the rate of one per week for some years—a rate of production sufficient to meet the demands of expansion of the electrical distribution systems within this city. The total weight, fettled, is 3,748 lb. The greatest advantage accruing from the application of the CO_2 process to this casting was that of the dry removal of the mould from the non-slip square pattern of the casting top face. This had always been a difficult operation with



FIGS. 6 and 7.—*Views of the cope and drag sides of a pattern for a transformer-vault cover. The casting from this pattern weighs almost 1¼ tons. The application of the CO_2 Process to its production solved the difficult problem of sand removal from the non-slip surface shown above (Fig. 6).*

oil sand, when repair of the mould was resorted to in most cases. With a CO_2 mould it was found that no repairs were necessary. Gas was applied from mould rear through channels formed by round wooden rods and use was made of the conical adapter. By this method gas was introduced to mould faces around webbed area. The gassing of the cope (square pattern) was carried out in the same manner, wooden rods being set over this area as distances of approximately 10-in. apart.

The times for gassing were as follows:—Total time for cope—20 min.; total time for drag—20 min.

Moulding procedure was as follows:—

(1) Set-up pattern on greensand bed, square pattern downwards, (2) ram drag (web section), (3) rollover (drag and bed), rap pattern, gas, leave in casting position, (4) ram cope and gas, (5) remove cope, (6) remove top section of pattern, (7) remove web sections of pattern (these are loose and in three sections). See Fig. 6—cope side, and Fig. 7—drag side.

Although success was achieved with this method of gassing, a fabricated rig is being considered for future orders of this cover so as to give a greater economy in gas.

Large Cores

Gas Main

See Fig. 8 for curved-gas-main core equipment. The centre pipe was produced from 8-in. steam piping, and the gassing pipes were made from ¾-in. gas piping. The temporary supports, resting on the sides of the half box, were used to maintain correct central position of the 8-in. pipe, these supports being removed as soon as the sand was rammed to the half-way position. A number of patterns had previously been varnished with shellac which we found was prejudicial with CO_2 sand in that sticking occurred. In order to prevent considerable work in the removal of this varnish, a good dusting with graphite powder was found to be a preventive, or better still, a light coat of core dressing. This method was used in the moulding of this piece. As may be seen from the illustration, end lugs were welded centrally at the pipe ends (8 in.) and drilled for attaching flat bars. These bars rested on spiked blocks set in the floor mould at the horizontal centre line of the casting. On the positioning of the core in the mould the core automatically takes up its correct position, tilting is prevented, and this position is checked by use of the strickle prior to closing the mould. The bars are secured to

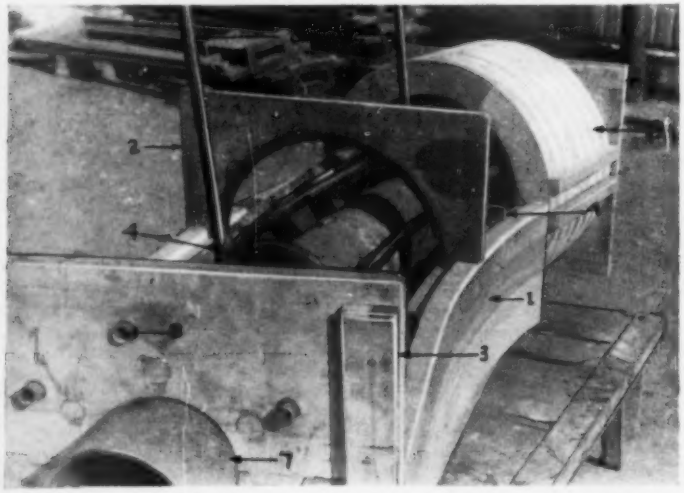


FIG. 8.—*Strickle-tackle and equipment for the production of a curved-gas-main core.*

(1) Half box, (2) top-half strickle, (3) removable end-boards for supporting centre pipe and gas pipes, (4) temporary supports for centre pipe, (5) lifting hooks, (6) top-half box section for forming swelled end of core, (7) centre pipe, (8) gas pipes.

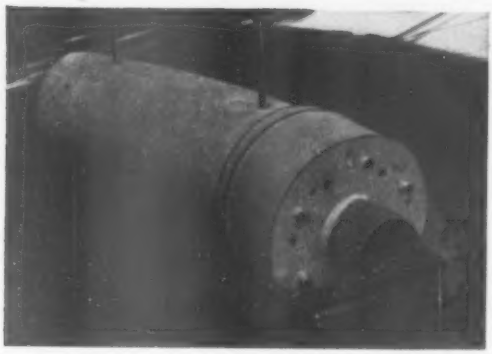


FIG. 9.—*Finished core made from the tackle shown in Fig. 8.*

the lugs by two bolts for quick removal during knockout. Gassing was carried out by application of the coned rubber adapter to the pipe ends. One end of the pipe was closed by welding as may be seen in the illustration. The pipes were drilled at intervals of 2 in. staggered, in two planes, a $\frac{1}{16}$-in. drill being used. Gassing time was 2 min. per pipe, making a time of 12 min. for the whole core. The sand used was Type H. See Fig. 9 for the finished core.

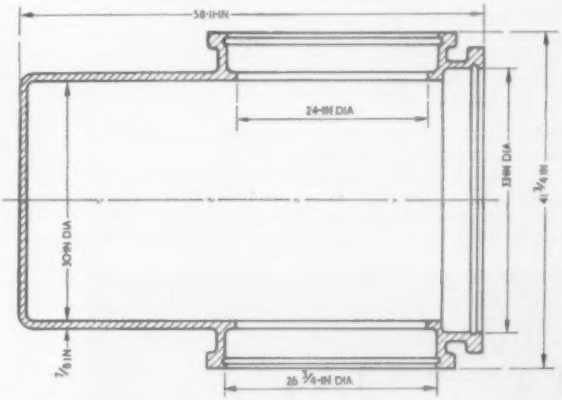
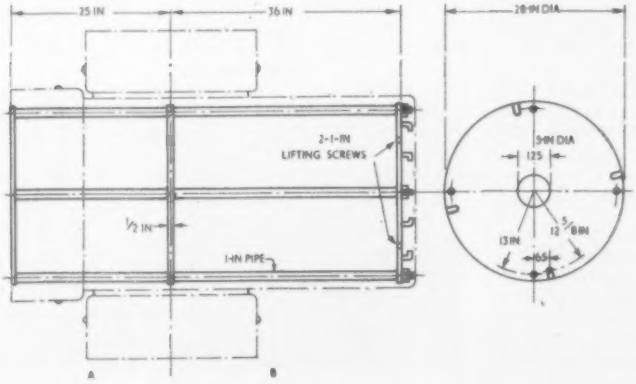


FIG. 10.—*Siphon-casting drawing demonstrating the bulky body cores to which the CO_2 Process was successfully applied at the Brazilian foundry.*

Gas Siphon

Fig. 10 shows a drawing of a siphon casting which is used in the gas distribution system of Rio de Janeiro.



The core equipment used for this casting is illustrated in Fig. 11. This consists of two of sets of steel flanges, each set being held together by steel rods screwed at the ends, and pipe distance-pieces. The core was made in the following manner:—

Section A

To provide a base for the build up and strickle of sand, a light mild steel ring was made with a diameter slightly more than 33 in. This was positioned concentrically with strickle centre, on a greensand bed, and the lower portion of the core rammed within this ring. The ring was then removed, a strickle-board fitted, and this part of the core finished to diameter. The remainder of this section was then built up with sand and finished by strickle. Gas was applied by insertion of the 19-in. injection rod from top face at intervals around, and approximately 2 in. from the periphery. The total drying time was 10 min. It should be mentioned that a centre steel ring of 19-in. dia. was used to provide a hollow core. This was removed before gassing.

Section B

The procedure for section A was adopted, using a steel ring slightly more than 30-in. dia. and approximately 14-in. in height. After ramming the base portion, the ring was raised, and ramming continued until full height was completed. The strickle board was then positioned and final diameter of core swept. Gas was then applied by insertion of the 19-in. rod from the top face. The lower part of this section was gassed by insertion

FIG. 11.—*Sketch of the core equipment for the siphon casting depicted in Fig. 10.*

FIG. 12.—*Pattern for a cast-iron spiral coke chute seen with the fabricated gassing ring in position. The arrow indicates the rig-pipe outlet. This pattern was reproduced in aluminium for production.*

of the short rods in a horizontal plane, and working gradually round the periphery.

The two sections were then bolted together by means of the circular plates, and the bolt access holes afterwards filled in with CO_2 sand. When making sand repairs it was found best to coat the

FIG. 13.—*Finished casting produced from the aluminium version of the pattern seen in Fig.* 12.

area with core-glue before applying the sand. The side cores for forming the outlets were also strickled and gassed, and then positioned separately in the mould.

Fabricated Rigs

Coke Chutes

Fig. 12 shows a wooden pattern in preparation for moulding by the fabricated-rig method (drag side). This wooden pattern was reproduced in aluminium, which is now in use for producing cast-iron spiral coke chutes for the gas company. The illustration shows the pattern supported by a greensand bed, with rig in position, prior to facing with CO_2 sand. After preparation of the pattern and sand bed as shown in the illustration, the pattern was faced with approximately 2½ in. of sand Type A. The drag was then positioned and rammed with green backing sand, a flexible rubber pipe having been fitted to the rig-pipe outlet (arrow) and led to the rear face of box for gassing purposes. Drag and sand-bed were then secured together and rolled over.

The procedure continued as follows:—Remove sand-bed, rap pattern, apply gas. Cope and cope-rig were then positioned, and ramming and gassing continued as above. For security reasons the cope-rig was secured to the rear of the box by two rods, fitted with bracings, prior to ramming. Fig. 13 shows the finished casting, from the pattern reproduced in aluminium.

Gas-main Pipes

The half pattern and rig shown in Fig. 14 are used for the moulding of radiused gas-main pipes 19¼-in. dia. internal, and 21¼-in. dia. external, on the pipe section. The moulding of this casting was carried out in the following manner. The lower half pattern, together with its rig, was set in a pit, the CO_2 sand and the green backing sand being rammed around the sides of the pattern to form the drag. A flexible rubber pipe was led to the face of the mould for gassing purposes. The pattern was then rapped and gassing effected, the gassing time being 5 min.

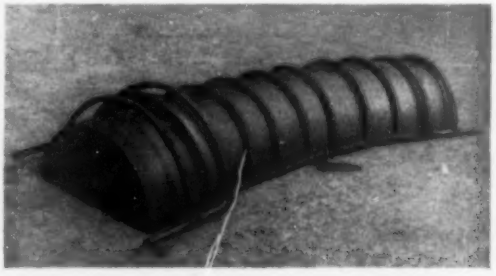
The top half of the pattern, together with its rig, was then positioned on top of the bottom half and cope rammed. Gas was then applied, with a gassing time of 5 min. The cope was then removed, leaving the pattern in its original position, mould was dressed and core positioned ready for final closing operations. The cope, resting on the drag, above floor-level, was bolted with two rods to the drag plate at the bottom of the pit, so securing both mould and core.

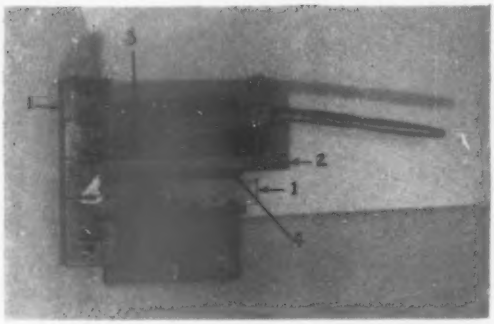
Conclusions

In view of the jobbing nature of the foundry, the application of the CO_2 Process required the individual consideration of each case, and development of technique in accordance.

The foundry was still passing through the early

FIG. 14.—*Half pattern with rig for a radiused gas-main pipe.*





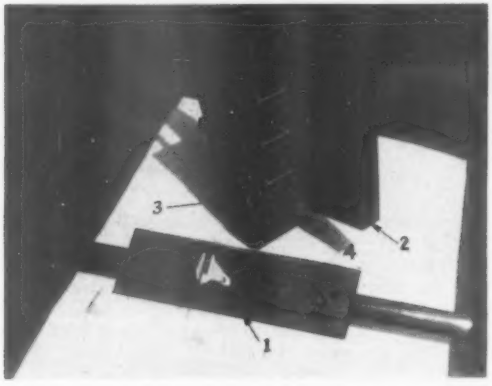


FIG. 15 (*above*) *and* 16 (*below*) *show two views of the gravity-die used for the making of gas-meter regulators. Key:* (1) *die-body,* (2) *operating base,* (3) *ejection plate, and* (4) *the ejector pins.*

stages, relatively, since the process had been introduced only six months previously. During this time it may be said that the following advantages have been noted: (1) Economy has already been felt in the use of CO_2 as against our town gas fired ovens, (2) the finished quality of the casting has improved, (3) the greater turn-over of moulds caused by rapidity of drying has counteracted our lack of floor space, (4) core drying economy has been accentuated by air or sun drying, (5) cleanliness has improved, (6) reduction in the use of reinforcements, (7) repairs to dry moulds are now practically negligible, and (8) fettling time has consequently been reduced.

Due to the diversity of work it could by no means be said that this process is the end of all the troubles, and difficulties still have to be surmounted, but it can be said in this case, that the process has come to stay.

GRAVITY AND PRESSURE DIE-CASTING

Gas-meter Regulator Die

The gravity die for the production of gas meter regulators may be seen in Figs. 15 and 16. The drawing of the cast piece is shown in Fig. 17. Materials used were as follow: Die body—hot-die steel, composition, C 0.8, W 10 per cent.; operating base and ejection plate—carbon steel C 0.25, Mn 1.0 per cent.; ejector pins—steel wire 13 S.W.G., C 0.5/0.6, Si 0.5, Mn 0.6/1.0 per cent. All faces of the two halves of the die were planed and ground, the two $\frac{1}{8}$-in. locating pins having been positioned prior to final planing and grinding operations. The centre line of the piece was taken as the parting line of the die, and marking out of the pieces on each half of the die was then initiated. The foundry was not in possession of a jig borer, or a profile cutting machine, so that this operation required extreme accuracy on the part of the toolmaker. Milling of the profile to the depth ($\frac{1}{64}$-in. per side) was then carried out together with the boss and lip profile ($\frac{11}{64}$-in. in height). A drilled locating hole was necessary to accommodate the

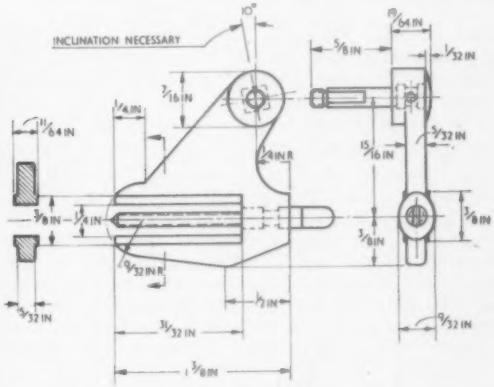


FIG. 17.—*Sketch of the die-casting made from the equipment in Figs.* 15 *and* 16.

brass screw which is cast *in situ*, and in order to facilitate setting of the 10 deg. rake, a bush, already prepared with locating flutes, was pressed into a milled hole in the die at the correct angle. The locating bores for the brass screw, also cast *in situ*, were then milled on both halves and then finished bored with reamer. The runner heads were then drilled, and the ejector pin holes, three per casting, together with ejector plate. The air off-takes, which may be plainly seen on the photograph, were milled, $\frac{1}{16}$-in. wide by $\frac{1}{32}$-in. deep maximum, tapering to 0.005-in. at the piece. The alloy used for the casting of these pieces has a composition as follow: Lead 80, tin 15, antimony 5 per cent. The most-satisfactory die temperature was found to be 150 deg. C., and the temperature of the metal 246 deg. C.

Gas-meter Bracket

A gravity die for the production of small gas-meter brackets may be seen in Fig. 18. The drawing of the piece is shown in Fig. 19. Materials used for the gas-meter regulator die, and the base

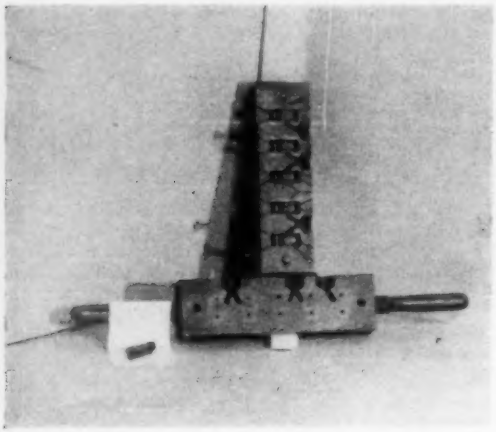


FIG. 18.—*Die parts for a gas-meter bracket—used in conjunction with the operating mechanism for the gas-meter regulator die. Insert for making shape of the lugs seen on the left.*

and operating lever shown in Figs. 15 and 16 were also utilized. All faces of the two halves of the die were planed and ground, the two $\frac{1}{4}$-in. dia. locating pins having been positioned prior to final planing and grinding operations. The flat side of the bracket was taken as the parting line of the die, the full depth of the piece thus being located in one half-die, the other half receiving drilled locating holes for the brass screws which are cast *in situ*. These holes may be plainly seen in the illustration. The die cavities in the one-half die were so-formed by the insert method. Rectangular slots were opened in the die by drilling and shaping, final finishing of these slots being done on a die-filling machine. Five inserts were then milled to form the shape of the under side of the bracket and lugs—as shown in the drawing—the outside dimensions of these inserts corresponding to the size of the rectangular slots plus 0.0005 in. Fig. 20 shows the insert in position. These inserts were then pressed into the die by means of a hand press. Runner heads and runners were then drilled and milled, and ejector-pin holes, two per piece, one at base of each lug, were drilled together with the ejector plate. The air off-takes may be plainly seen in the photograph $\frac{1}{16}$-in. wide by $\frac{1}{32}$-in. deep, tapering to 0.005-in. at cast piece. The alloy used for this casting was as for the gas-meter regulator. The hole marked drilled (0.152 in.) was cored by means of steel wire.

Gas-meter Connecter

A gravity die for the production of gas-meter connecters may be seen in Fig. 21. The drawing of the casting is shown by Fig. 22. The materials used were as in the previous instances. No ejector pins were used for this die but the centre core pins (X) were made retractable to facilitate removal of the castings. An ejector plate similar to that shown in Figs. 15 and 16 was used for this purpose. To facilitate machining operations each half of the die was made in two parts, the dividing line coinciding with the junction between the U-shaped head and the cylindrical shank. These two parts were positioned by dowel pins and finally secured together by spot welding. All faces of the two half-dies were planed and ground, the two $\frac{1}{4}$-in. locating pins having been positioned prior to final planing and grinding operations. The two parts of each half-die were then separated, having been

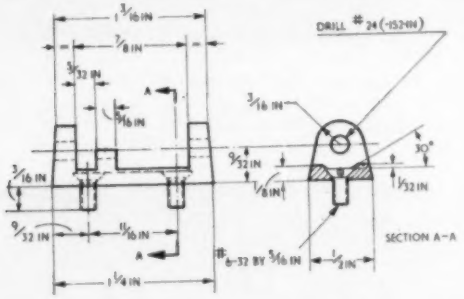


FIG. 19.—*Drawing of the part made in the die photographed in Fig.* 18.

temporarily held together by means of a set screw. Setting out, and drilling and reaming of the 10 movable core guide holes was completed on one half-die and transfer of these holes made to the other half-die in the closed position so as to secure accuracy. Setting out of the U-shaped head was

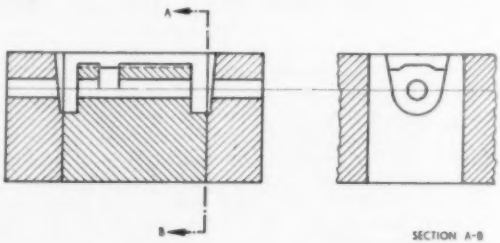


FIG. 20.—*Cross-section of the die* (*Fig.* 18) *showing the insert used* (*centre portion*) *to simplify die-making operations.*

then done. and these cavities milled. The cylindrical-shank cavities were then drilled and milled to size. The full-length core-locating hole for the forming of the fixing holes in the shank was then milled on both halves. The centre line of this core-locating hole was taken as the parting line of the die. The core used was made of steel wire. Runner heads were then drilled and milled, movable cores turned and fitted to the ejector plate, and the

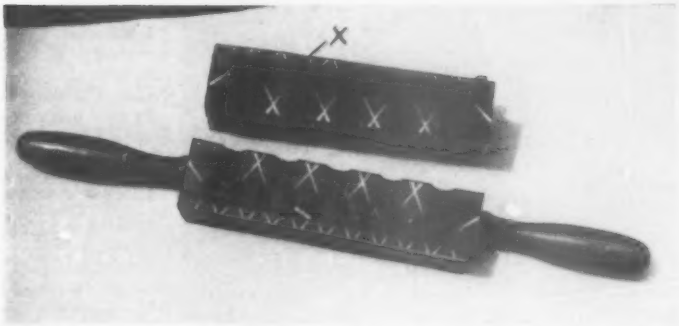


FIG. 21.—*Gravity die for gas-meter connectors without ejector pins—a function fulfilled by making the core-pins (x), retractable.*

longitudinal core fitted. The air off-takes were then milled, $\frac{1}{16}$-in. by $\frac{1}{32}$-in. tapering to 0.005-in. at the casting. The alloy used for this casting was as for the bracket casting.

Gas-meter Link adjuster

The die shown in Fig. 23 was made for use on the pressure-die-casting machine. This machine, a "Kip-Caster," was a "vintage" model, having been first installed in 1925, but it continued to produce castings in large quantities.

The same die materials were used as in the other examples. The half-die shown on the left of the photograph is the fixed die, and the one on the right the movable die, ejection being effected by retraction of this half-die. Ejection occurs when

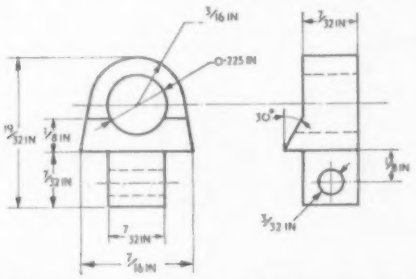


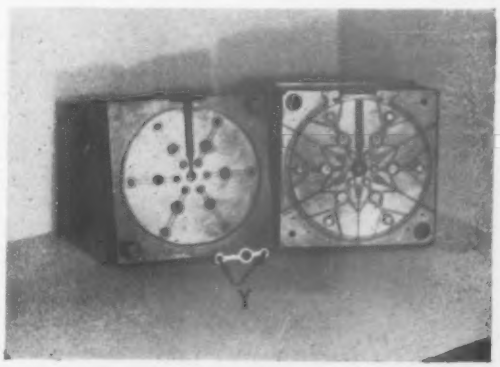
FIG. 22.—*Drawing of the casting to be produced from the die shown in Fig.* 21.

stop pins come into contact with the machine bolster-plate, the ejection pins thus being held stationary while the other parts of the movable-die complete the opening stroke. The sizes of this die are as follow: Half-dies—$9\frac{7}{8}$-in. by $9\frac{7}{8}$-in. by $1\frac{1}{4}$-in. thick each; diameter of mating spigot—$6\frac{7}{8}$-in., with 0.008 to 0.010-in. play to prevent gripping when hot; Diameter of guide pins—$\frac{3}{4}$-in. The dies were planed to size, the spigot marked out and turned in a lathe, and the recess then turned to receive the spigot. The faces of both spigot and recess were turned to a fine machine finish and finally scraped together to provide a tight joint on the face. The two guide pins were then fitted. The links were marked out in the form of a spider on the recessed side, and drillings made at each link end, and in the centre portion (larger diameter). The die was then closed and these holes transferred by drilling to the second half. They were finally reamed to size, the smaller diameter holes being equal in size to the internal diameter of the cast *in situ* brass bushes (Y). The beaded-edge profile on the fixed-die was formed by means of a steel-stamping-die milled to the shape of the piece as shown, the profile being stamped cold on the die by means of the hand press. The profile on the movable-die was milled to depth. Pins for the location of the brass bushes were turned and pressed into the movable-die together with pins for forming the link-centre adjusting hole. Ejector-pin holes were then drilled to receive steel-wire pins 13 SWG, three per casting, which may be seen in Fig. 23. The air off-takes are also shown. The same alloy used for this casting was as for the regulator casting.

Aluminium Lamp-holder

The die shown in Fig. 24 is a gravity-die used for the production of aluminium-alloy lamp-holders for street lighting in Rio, the drawing of this holder being shown in Fig. 25A. The side cores are not shown in the illustration but may be seen in Fig. 25B, which shows the core-extraction method adopted. For the operation of these movable cores mechanism was designed and made within the company's workshops, and installed in the foundry. This provided a handwheel and

FIG. 23.—*Die for use in a pressure-die-casting machine, showing the fixed die on the left and the movable die on the right. Y indicates cast in situ brass bushes.*



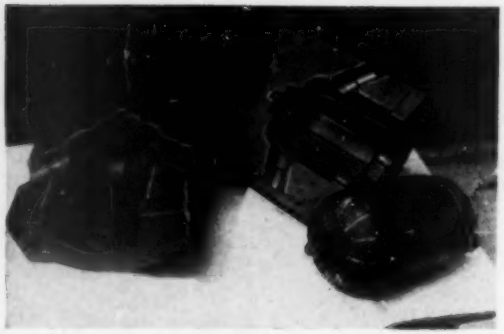
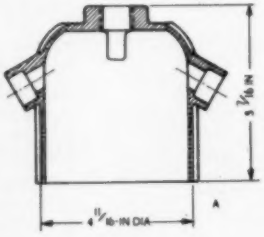


FIG. 24.—*Gravity die for producing aluminium lamp-holders.*

screw for extraction of the main core, and a pedal control for the extraction of the side cores. The dies and the main core were cast in a heat-resisting cast iron, the die halves being cast almost to size, with a minimum allowance for clean up by filing and burnishing on the curved surfaces. A machining allowance for planing was allowed on the faces, and the bores for receiving the side cores were machined afterwards. These side cores were turned from hot-die steel. The method of casting was by means of two ladles, one on either side of the main core.



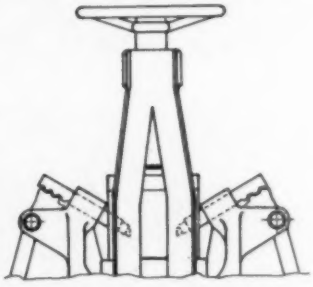


FIG. 25.—*(A) Shows a sketch of a section of the casting, and (B) illustrates the method of extraction of the core.*

Guide Bearings

Fig. 26 shows a gravity-die used in the production of guide bearings for gas-meter mechanisms. This die was cast in gun metal (copper 88, tin 10, zinc 2 per cent.), the casting cavities being cast almost to size with a minimum allowance for clean up by filing and burnishing. A machining allowance was given on all the faces for planing. The centre locating holes for the removable cores were milled, and the screw profiles turned in the lathe. The $\frac{1}{4}$-in. dia. holes under the screwed part were locating holes for the die which mated with dowel pins in the base. The dies were held together by means of a simple handwheel arrangement, and no ejector pins were used. Manual knock-out was used in the first instance, but an ejector system has been planned for future use. The air off-takes and runners may be seen in the illustration.

Conclusions

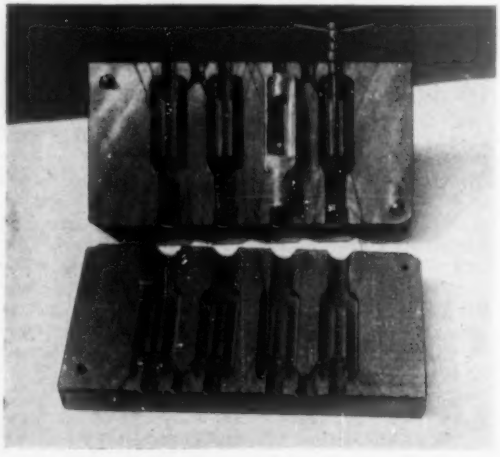
In retrospect, and by reading through the above paper, the impression may have been created that these dies were made, and the castings produced, with the minimum of effort. However, it must be mentioned that each one was treated as an individual case, and considerable experience was gained in the process. Some mistakes were made in the initial stages, and alterations were made to runner systems before the results could be brought to a successful conclusion. The main points to be observed with regard to casting methods are the placing of runners, position, size, and number of air off-takes, and the position of the die-heating source.

In the instances cited, all of these had to be worked out. From the point of view of tool making, the use of inserts is always worthwhile considering, especially if machine facilities are limited.

Acknowledgment

The Author wishes to thank the management of Rio Light S.A., of Rio de Janeiro, Brazil, for permission to publish this paper.

FIG. 26.—*Gunmetal gravity die for gas-meter-mechanism guide bearings—the existing manual knockout was to be replaced by an ejector mechanism.*



National Chemical Laboratory reports on 1960

"Inasmuch as the chemical industry of the country continues to expand, the need for research in the chemical field by the Government will inevitably grow," says the steering committee of the National Chemical Laboratory of the Department of Scientific and Industrial Research in their annual report. The Committee therefore recommends to the Council for Scientific and Industrial Research that the staff of the Laboratory should be increased by roughly one-half in the next five to seven years and doubled in the next 10 to 15 years. Existing accommodation at Teddington is inadequate for this expansion and proposals for either building extensions or a new site are under consideration.

In his own report for 1960, the director, Dr. J. S. Anderson, F.R.S., says that the current research programme is still being developed, and some material changes were made in the work of several research groups during the year. For example, the conversion of the former work on physiochemical properties into a more comprehensive programme of chemical thermodynacis has continued, work on hydrometallurgy is being extended to include some fundamental work on the more familiar metals of industry; and staff formerly employed on the extreme purification of semi-conductor materials are turning their attention to uses for the very sustantial quantities of rare-earth elements now becoming available. Research work carried out by the Laboratory during 1960 includes:—

Uranium and Beryllium from Low-grade Ores

Studies have been made of the problems arising in the chemical extraction of beryllium from low-grade ores, using flotation concentrates arising from ore-dressing research at the Warren Spring Laboratoy of the Department of Scientific and Industrial Research. A modified rotary-film disc contractor with 16-in. discs has been developed for the solvent extraction of uranium from ore slurries. It is capable of dealing with 30 lb. per hr. or 720 lb. per day of dry ore on a continuous run with acceptable solvent losses. A similar contractor with 40-in. discs is now being constructed which, on this basis, would be capable of dealing with 1 ton of dry ore per day. Another process is the heap leaching of uranium ores, a development of natural leaching in which sulphuric acid is produced by the action of rain and of atmospheric oxygen on pyrite ores.

Separation of Rare-earth Elements

The inorganic group reports on two new series of experiments concerned with the separation of rare-earth elements. A continuous sodium-amalgam process for removing semarium, europium, and ytterbium from concentrates has been operated. For complex mixtures of the rare-earths, the ion-exchange separation is time-consuming and involves large volumes of solutions; and a new and rapid solvent-extraction method is therefore being studied, in which aqueous solutions of lanthanons are extracted by tributylphosphate.

Corrosion

The corrosion of metals group has been studying the prevention of corrosion in water, and the connection between corrosion in soils and the biochemistry of the bacteria responsible for it. Work has also been started on the study of corrosion problems in boilers operating at various temperatures from 100 deg. C. to above the critical point of water, 374 deg. C. Until now studies of this sort have been hampered by a lack of knowledge of the physical chemistry of solutions and of the behaviour of metals in contact with solutions at these elevated temperatures and pressures. The National Chemical Laboratory has started to overcome this lack of knowledge by extending the scope of conventional techniques.

Uncontaminated Metallic Surfaces

Work has started on the study of physical processes and chemical reactions on absolutly uncontaminated metallic surfaces, which can only be obtained under ultra-high vacuum. The aim is to study the mechanism of chemical reactions which take place on solid surfaces. An absolutely uncontaminated surface is extraordinarily reactive, and practically every molecule colliding with it undergoes reaction. Dr. Anderson is continuing work he began at the University of Melbourne on the condensation, migration, nucleation, and penetration of copper, nickel, and other metals evaporated on to a tungsten surface. A Research Fellow has started work on the related and very powerful technique of field ion microscopy, which is capable of imaging individual atoms on the metal surface. The object is to study the nature of the surface sites involved in the chemical absorption of oxygen and other reactive gases, and the subsequent processes in the first stage of heterogenous reactions. Although studies of this sort are in their infancy and future developments are largely unknown, it will be possible to examine more closely than before how the ocurrence of chemical reactions and the formation of their products is related to the detailed atomic configuration of the reacting surface.

Law Case

Pneumoconiosis Test Case

Test case raising the question whether a pursuer claiming damages for pneumoconiosis is entitled to refuse to be medically examined by a specialist selected by the firm who were his employers, was heard in the first division of the Court of Session. The action is by Mr. Mungo Chapman Lawrie, sand blaster, against the North British Steel Foundry, Limited, Bathgate (West Lothian). Last July Lord Cameron declined to order Lawrie to be examined and, on the basis that the same attitude might be taken in all similar future actions, the defenders appealed on a matter of principle.

Mr. G. C. Emslie, QC, for the defenders, said the question was whether a pursuer was entitled to refuse to be examined on behalf of the defenders by a specialist who was attached to the hospital where he was X-rayed, or by a specialist who might have examined or treated him in any hospital. The case was still at the stage of the open record, and the defenders wanted to know whether they should contest Lawrie's claim or settle it, and the information which the proposed medical examination was expected to reveal was necessary for this purpose.

Mr. L. R. Hamilton, for the pursuer, submitted his client had reasonable grounds for refusing to be examined by this particular doctor, because there was already in existence a doctor-patient relationship which brought into operation the principle of confidentiality.

Lord Guthrie said the argument appeared to be that, where the doctor-patient relationship existed confidence had been exchanged between the pursuer and the doctor, and it would be unfair that the defenders should be able to take advantage of the confidential information so given for the purposes of the preparation of their defence.

The case was adjourned to give the pursuer's advisers an opportunity to ascertain from the hospital records whether in fact Dr. Kelman Robertson treated him.

Revival in Industry

Latest survey by the Federation of British Industries on trends in UK industry shows that there has been a revival in new orders, a consequent lengthening of order-books, and an increase in output, compared with the situation when the last survey was taken in February. Stocks at all levels have risen, and industry generally is using rather more men for longer hours. Shortage of skilled labour has again become the main impediment to increased output.

Industrialists who answered the latest FBI survey, prepared at the beginning of this month, were generally more optimistic about the outlook than four months ago. A disquieting feature, however, is that half the firms questioned were still working below full capacity.

In February it was pointed out that the balance of firms reporting a rise in costs was the highest since inquiries began. This time, a further substantial rise in costs is suggested, coupled with a much smaller rise in selling prices and a further lessening of profit margins. The increase in the balance of firms reporting a rise in costs and a fall in margins was greater than expected—a situation to which the rise in fuel-oil tax may have contributed, it is stated.

The chief limiting factor to expansion has once again become shortage of skilled labour. This has replaced lack of orders, the chief difficulty four months ago. Investment continues, however, and over the new year it is expected that less will be spent on building and rather more on plant.

A detailed inquiry was this time made into exports which showed a significant improvement in the rate of new export orders and deliveries for the first time since a year ago. The improvement, however, is less than that shown for the home trade.

The replies to the questionnaire showed that despite a rise in export orders on hand, delivery dates have been shortening somewhat and that more orders have been booked at lower prices, in contrast to the reported rise in prices for the home market, and the general rise in unit costs of production. Despite this fall in prices, however, the comparative price level is by far the most serious short-term problem facing exporters.

The broad conclusions of the inquiry are that there has been a rise in orders and output, but this applies more to the home than to the export markets. The most disturbing factor is the continuing rise in production costs, particularly as price is seen to be the main obstacle to higher exports.

The current market prospects can be grouped as follows:—Significant improvement—North America, the Six, the Seven, and the Communist Block; little improvement—Central and South America, Middle East, South-East Asia, and Japan; moderate worsening —Australasia, Africa, and India.

W. H. Allen and World Competition

Although the manufacturing capacity of W. H. Allen, Sons & Company, Limited, mechanical, hydraulic, and electrical engineers, of Bedford, will be fully occupied during 1961, the order-book is now less full than 12 months ago, reports the chairman, Mr. W. K. G. Allen. He points out that the order-book position must be expected with the increasing world competition and shorter deliveries.

The company's efforts on research, design, and productivity, are directed to better products at lower costs, he adds, and the results of these efforts will go some way towards meeting the keener international competition that lies ahead.

Pressure-die-casting grows in Europe

In Western Europe, the record total production of pressure-die-castings in zinc- and aluminium-alloys in 1960 was about 18 per cent. above the 1959 level, according to data collected at a meeting of the European Pressure Die Casting Committee in Vienna last month. Details are given in the table below. Members reported that in spite of the lower rates of car production generally at the beginning of the year, business was now very active again.

Production of Pressure-die-castings in Western Europe.

	1959.		1960.	
	Zn. (Thousand	Al. tonnes.)	Zn. (Thousand	Al. tonnes.)
United Kingdom ..	58	23	65	27
France	20	15	22	18(est.)
W. Germany	25	24	32	31
Italy	7	18	9	21
Others (partly est.). .	7	7	8	8
Total	117	87	136	105

The Committee also discussed plans for its fourth International Pressure Die Casting Conference to be held in Munich from May 6 to 10, 1963. Details will be published when the preliminary programme is ready next year. Members were given copies of the eighth edition of the European Zinc Alloy Die Casting *Bulletin* which has been edited in Germany and deals with die-castings in motor-cars; the English, French and Italian editions will appear during this summer. It was agreed that the ninth *Bulletin* to be prepared in the UK by the Zinc Development Association, 34, Berkeley Square, London, W.1, will show examples of zinc-alloy die-castings in domestic equipment. The next meeting of the Committee will take place in England in the autumn.

Medical Service for Small Firms

An industrial medical service for small firms who cannot afford to provide their own may soon be set up by members of the West Bromwich, Smethwick and District Manufacturers Association.

At a meeting in Smethwick, 16 firms agreed to provide the £75 needed to set up a non-profit-making limited company as a basis for the scheme. If the Association's members decide to go ahead with the service it will be the first in the country to be sponsored by employers and will be based on the Harlow industrial medical service founded by Lord Taylor of Harlow. Lord Taylor told the meeting that the medical service would eventually save employers thousands of man hours a year and increase production with very little loss to their pockets. He advised the industrialists to apply to the Nuffield Foundation and the Ministry of Labour for grants.

PARTS OF THE REPORT on the Census of Production for 1958 now available from HM Stationery Office at York House, Kingsway, London, W.C.2, and branches, or through booksellers, include:—Part 38, Iron and Steel (General); price 2s. 6d. (postage 2d. extra); Part 40, Iron Castings, etc.; price 2s. (postage 2d.), and Part 74, Jewellery, Plate and Refining of Precious Metals; price 2s. (postage 2d.).

*Craft Apprentices' Corner**

Cupola Operating Data . . .

. . . with "Tubal Cain" on the Job!

I'm talkin' to one o' you young fellers a few days ago an' 'e's tellin' me 'ow much 'e enjoyed readin' our last article on "Melting Iron in the Cupola."† Naturally I'm feelin' pretty chuffed about this, an' between us we are knockin' up quite a nice little natter about cupola operation in general. Well now, pretty soon I get around to realisin' that my young companion, keen an' interested tho' 'e is, ain't too conversant with the basic fundamentals o' the job, so I sit tight an' wait for it, an' sure enough it comes. "Look sir," 'e says, "I can follow the meltin' process easy enough; y'know, the coke bed, the metal an' coke charges, 'ow the metal is melted and so on, but I 'aven't the foggiest about assessing the quantities required. It's one thing to say 'put on a metal charge,' or 'build up the coke bed,' but if I 'ad to do it I wouldn't know 'ow *much* metal to put on, nor 'ow *high* to build up the bed! I've often wondered what would 'appen if, to exaggerate a bit, everybody connected with a particular cupola were suddenly unable to turn into work one day. Let's say they've emigrated to a foreign country or somethin', an' 'ave destroyed all the records or other information on the past working of the cupola. Let's say also that the cupola must operate as usual and that melting must continue as if nothin' 'ad 'appened. Now sir, whoever took that cupola over would 'ave to start from scratch. What I can't figure out is where he would start, and how would he know that his calculations would give definite results, as opposed to trial and error guesswork?" "Now that's a point son," I says, "A good point, an' one which is worth answering in detail."

Melting Rate

Right then, let's see where we are and what has to be done. This cupola is new to us and nothing is known about it except that it is in working order. Now, where to start?—the *only* place is inside the cupola, taking measurements with a steel tape-rule. First, take the internal diameter at the melting-zone; from this measurement both the melting rate of the cupola *and* the weight of the coke charge will be determined. It is generally agreed that a cupola melts 10 lb. of iron per hr. for every one sq. in. of cross-sectional area at the melting-zone; hence, if our cupola is 30-in. dia. its cross-sectional area is 707 sq. in. and its melting rate is 7,070 lb. per hour, or just over three tons per hour—but ignore the little extra and assume three tons per hour. This is particularly important as it puts us in a position to determine the time that must elapse during melting before the cupola-well becomes full and ready to be "cast up."

Amount Per Tap

At this stage we need to know the holding capacity of the cupola-well, so that we shall know how *much* iron we can expect to get in one "tap." We already know that this is governed by the distance between the cupola bottom and the slag-notch, so let's take this measurement and then make a simple calculation. Assume the distance from the cupola bottom to the slag-notch is 24 in. we now have to find the cubic capacity of the well, so applying the formular $\pi r^2 h$ (where h is the height) for the area of a cylinder, we obtain—π 15^2 by 24, *i.e.*, 16,970 cu. in. It is fairly safe to assume that the "well coke" will occupy 60 per cent. of this volume, leaving the molten iron to lie in the remaining 40 per cent.; hence the space available for molten iron is 40 per cent. of 16,970 *i.e.*, 6,788 cu. in. Assuming four cu. in. of iron to weigh one lb., this volume is equal to 1,697 lb., or roughly 15.2 cwt. Thus we can reckon on the well holding (when full) about 15 cwt. of molten iron, and as we shall still be melting whilst this quantity is tapping into the ladle, a maximum of approximately 24 cwt.—depending, of course, on the rate, and hence the duration, of the tapping—in one tap may be obtained.

Coke Bed

Before putting away the tape rule there is one very important measurement we *must* have, and this is the Height of the coke bed. This may be obtained by inspecting the cupola lining to ascertain the maximum height of the melting zone; this will be easily identifiable by the "burned back" part of the lining. Now, note carefully—the minimum safe height of the coke bed above this line is equal to two layers of charge coke, one for a "safety layer" and the other for a "working

D

* Popular jargon of the foundry floor has been used in parts of this article—apologies are made to translators.

† See JOURNAL, April 14, 1960, p. 464.

Cupola Operating Data

layer," hence from this we can fix the height of the coke bed 12- to 16-in. *above* the maximum height of the melting zone. But wait—when we are actually building up the coke bed we shall be unable to check the height from the cupola bottom, but we *can* check it from the charging-sill, so the measurement we really want is the distance *down* the cupola shaft from the charging sill to the top of the coke bed. A Z-shaped iron rod of the desired length is the quickest and simplest way of doing this. We now have all the measurements we require.

Charge "Ingredients"

To complete the task there remains only to be found the relative weights of the coke, metal, and limestone charges for operational purposes. With regard to the coke charge, it is generally agreed that this should be spread evenly across the cupola in a layer 6- to 8-in. deep. To find the weight of such a quantity of coke is really very easy—simply build up a ring of cupola bricks 30-in. i.d. by 6-in. deep, fill this level with coke, and then weigh the coke. This will be found to be in the region of 84 lb. Now the weight of the coke charge governs the weight of the metal charge, based on what is referred to as the "metal:coke ratio," an average ratio being 8:1, that is, 1 lb. of coke melts 8 lb. of metal. Thus with a coke charge of 84 lb. the metal charge will be 672 lb. It should be remembered that this weight is calculated on an 8:1 ratio, but it must be noted that this is *not* a fixed figure, and according to cupola design and operating conditions this ratio may be anything between 6:1 and 12:1. However, the figure 8:1 has been chosen because it will offer a pretty safe margin. The limestone charge is usually calculated as being 2 to 4 per cent. of the weight of the metal charge; *i.e.*, a mean figure of 3 per cent. of 672 lb. gives 20 lb. of limestone per charge.

Experience Counts

There is now available all the operational data for this particular cupola and it can be safely assumed that if these figures are followed there is no reason at all why they should not prove successful. Bear in mind, however, that this does not necessarily mean that they represent the most satisfactory nor even the most economical operating quantities—only experience gained in actually running the cupola over a period of time would establish this. And this is where the art of good cupola operation is seen—as experience is gained in the behaviour of the cupola under known operating conditions, small adjustments to these conditions can be made and their effect upon the overall results in terms of chemical analysis, tapping, temperature, and economy noted, and, of course, acted upon.

THE NEW WING of St. Elizabeth's Hospital, Tilburg, Holland, is to be fitted with food-service equipment manufactured by Allied Ironfounders, Limited, Falkirk.

Equipment and Supplies

Primers for Shotblasted Castings

Camrex Paints, Limited, P.O. Box 34, Hudson Road, Sunderland, have recently placed on the market two new coatings for application over newly shotblasted iron and steel castings. Known as "Shot Prime" and "Shot Kote," these have been developed for spray application and dry within three minutes, it is claimed. The makers further claim that metal surfaces so coated are resistant to rust for approximately 12 months and are capable of receiving subsequently any type of paint, with good adhesion. The covering capacity of both the new primers is quoted as approximately 60 sq. yd. per gal. with a film thickness of 0.001 to 0.0015 in. The finish is aluminium and the material itself is non-toxic. The second type of coating is recommended for application when the plate treated will eventually be in contact with oil or solvents, the other being a general-purpose primer, since it is stated to be the more economical.

Pneumatic Rams

A range of pneumatic rams, manufactured by J. Broughton & Son (Engineers), Limited, Pershore Road South, Kings Norton Factory Centre, Birmingham, has, it is stated, been extensively applied in mechanized foundry applications. Special features include heavy-duty wiper seals which wipe both piston-rod and guide-bar free of accumulated sand on the return stroke, these being fitted in addition to the inner pressure-seal on the piston-rod. All the seals can be replaced without dismantling the cylinder. The rods which are of either ground stainless steel or ground and hard-chrome-plated mild steel, run in long (replaceable) phosphor-bronze bearings, lubrication being by sealed cap-type grease nipple. To keep the guide-bar continuously clean—and thus ensure long working life—it is housed within a tube. The units can be supplied in a range of bores up to 12-in. dia. and with various strokes.

Carbide Injection

It is reported that tests indicate that carbide-injection equipment supplied by British Oxygen Company, Limited, will enable the Aston works of Spartan Steels & Alloys, Limited, to make more use of scrap metal in producing stainless steel. With the process it is claimed that the sulphur content of the raw material can be reduced to the required level without having to use relatively expensive pig-iron. The necessary equipment consists of a carbide dispenser and a lance, carbide being blown through the lance and into the melt by compressed nitrogen.

In a three-ton melt the sulphur was reduced from 0.078 per cent. to 0.024 per cent. in 20 min., using 200 lb. of carbide and 200 cu. ft. of nitrogen, it is stated.

Crane-makers' Merger. A merger of Clyde Crane & Booth, Limited, Newcastle, with Cowans, Sheldon & Company, Limited, is reported to be proceeding smoothly. Mr. J. B. Woodeson, O.B.E., chairman of Clyde Crane & Booth, has stated that the merger will, in general, strengthen the firm's position as crane-makers. He says, "It increases our technical resources, provides a wider range of products and expands our manufacturing capacity, which will enable us to offer quicker deliveries on large contracts."

PLASTICS & RESINS, LIMITED, Bilston, announce that its Metolux cold casting metal filler, is to be produced in quantity in the United States and Canada.

Iron Castings Production in 1960

Production of iron castings in 1960 was at a record level of 3,970,000 tons, slightly above the previous highest figure of 3,920,000 tons reached in 1955, states the Iron and Steel Board in its Annual Report from which the following extracts have been made. Production as a whole it is revealed was 13 per cent. higher than in 1959. Output of ingot moulds increased by 39 per cent., automobile and tractor castings by 13 per cent. and engineering castings by 14 per cent. Total output of all other castings increased by 7 per cent. but castings for domestic goods were only slightly up as a result of the credit restrictions.

Future Demand

In some sections of the industry it may prove difficult to maintain in 1961 the record levels of output achieved in 1960. Ingot-mould output then increased by 39 per cent. in contrast to an increase of only 20 per cent. in steel production.

TABLE 1.—*Production of Iron Castings* .(*thousand tons.*)

	1957.	1958.	1959.	1960.
Pressure-pipes and fittings	532	491	516	558
Building, domestic and consumer goods	565	498	549	560
Ingot moulds and bottoms	434	355	389	540
Railways (including rolling stock)	344	339	239	260
Motor vehicles (manufacture and repair)	364	389	486	558
Tractors	156	162	192	205
Engineering:				
Machine-tools	204	171	162	194
Agricultural machinery	47	47	54	57
Iron and steel works (including rolls)	155	140	132	148
Textile machinery and accessories	101	81	82	108
Marine engineering	77	68	57	60
Electrical engineering (including small fittings)	131	116	113	122
Other	419	380	353	392
Total engineering	1,134	1,003	953	1,081
Abrasives and unclassified	186	169	174	206
Total	3,715	3,406	3,498	3,968
Index: 1954 = 100	99.3	91.0	93.5	106.0

This indicates that there was a substantial building up of stocks during the year which is unlikely to continue in 1961. The demand for automobile castings at the end of 1960 was affected by the recession in the motor-car industry but the prospects were improving in the spring of 1961. Expenditure by industry on plant and machinery is expected to continue to rise during 1961 and this may lead to increased production of engineering castings. The building industry is expected to maintain a steady demand for iron castings.

Provision of Capacity

Since the total output of iron castings is increasing at a relatively slow rate, the provision of capacity does not present any general difficulty. Moreover, since the industry does not normally work a continuous three-shift system an expansion of output from existing capacity can be readily achieved provided the labour force is available.

In these circumstances market forces are likely to result in the concentration of production in the more efficient firms. The number of foundries in operation has, in fact, steadily declined during the last few years. It is estimated that the number in operation at the end of 1960 was 1,475 compared with 1,518 a year ago and 1,796 at the end of 1954. The foundries going out of production are almost all small ones with a weekly output of less than 20 tons and contribute little to the capacity of the industry. Some 40 iron foundries, too small to require notification to the Board, are known to have closed during the year.

Raw Materials and Fuel

In spite of the rapid expansion of the industry during 1960 no difficulty was experienced in obtaining adequate supplies of raw materials. Supplies of scrap were supplemented by the scrapping of cotton mills under the reorganization scheme for the elimination of excess capacity and stocks rose to record levels. As shown in Table 2, the proportion of all types of scrap used in the cupola charge increased slightly during the year from 63.3 to 63.7 per cent., suggesting a weakening of the upward trend of earlier years. The proportion of steel scrap in the total charge rose from 9.6 to 9.9 per cent. The decline has been mainly in the use of high-phosphorus pig-iron.

TABLE 2.—*Consumption of Pig-iron and Scrap in Iron Foundries.*

Year.	Pig-iron.		Scrap.	
	Thousand tons.	As per cent. of metal charged.	Thousand tons.	As per cent. of metal charged.
1957	2,159	41.0	3,112	59.0
1958	1,859	37.9	3,044	62.1
1959	1,868	36.7	3,216	63.3
1960	2,090	36.3	3,672	63.7

The increases in coal prices last September and the consequential increases in foundry coke prices are calculated, on the basis of the 1960 level of production, to add £966,000 a year to the industry's costs, an average of 4s. 9d. on each ton of iron castings produced. This does not take account of the extra cost of producing the iron supplied to foundries brought about by the higher blast-furnace coke prices.

As shown in Table 3, economies in coke consumption continue to be made. Consumption has fallen to 2.9 cwts. per ton of metal melted.

TABLE 3.—*Consumption of Foundry Coke.* (*million tons.*)

	1957.	1958.	1959.	1960
Metal melted in foundries	5.27	4.90	5.08	5.76
Foundry coke consumed	0.82	0.76	0.76	0.85
Ratio:				
Foundry coke to metal melted (per cent.)	15.6	15.5	15.0	14.8

By far the greater proportion of iron castings is made from metal melted in cupolas. The majority of cupolas are of the cold rather than the hot-blast type but the use of hot-blast cupolas is increasing. One advantage of the hot-blast over the cold-blast cupola is that it uses less fuel. Another is that the higher temperatures make possible the use of more steel scrap, a material which is cheap relative to foundry iron and which gives a metal low in phosphorus. Experiments are being carried out with oxygen enrichments of the cupola air blast.

Electric melting is also sometimes used when favourable power costs make this process economic, or when only small amounts of molten metal are

required. The effect of many of these new or modified processes is either to increase melting rates or to reduce direct fuel consumption or sometimes to improve the quality of the casting.

Technical Advances and Research

Capital expenditure by iron foundries in 1960 is estimated to be about £9,000,000 compared with £6,000,000 in 1959. The main expenditure was on mechanization, modernization and the improvement of working conditions. Research in the ironfounding industry is largely carried out by the British Cast Iron Research Association which maintains an experimental programme covering most aspects of the technology of ironfounding and the properties and service performance of iron castings. Current developments in the industry relate principally to melting practice, moulding and coremaking techniques, and the introduction of automatic and improved moulding machines and mechanical handling devices.

Safety, Health and Welfare

The Health and Safety Committee of the Council of Ironfoundry Associations has completed its report on pneumoconiosis in small foundries. The report has been distributed to all ironfounders, to the Ministry of Labour, to the Confederation of Shipbuilding and Engineering Unions, and to the national and trade Press. In April, 1960, nearly 100 delegates attended the second Conference on Health and Safety which considered such subjects as pneumoconiosis, dust control, first aid, and the problems of management and personnel in securing safe working in the foundry. A report of the Conference has been distributed to all iron foundries. The Joint Advisory Committee on Foundry Goggles submitted a third report to H.M. Inspector of Factories during the course of the year. The Health and Safety Committee in its future programme of work is undertaking a detailed analysis of foundry accidents and a study of first-aid arrangements in iron foundries.

Training and Education

The Training Committee of the Council of Ironfoundry Associations has made substantial progress during the year in the various training and education projects which it has initiated. The proposals for a national syllabus for training craft apprentices, culminating in an award of a Certificate of Craft Skill, now have the support of the City and Guilds of London Institute and it is hoped that the Certificate will be introduced during 1961. It is also hoped during the year to introduce a nationally recognized training scheme for foundry technicians which will include a new qualification to be obtained in technical colleges. The new three-year sandwich course for technologists at the National Foundry College, leading to the award of an advanced diploma, has now been inaugurated and has been well supported.

MELTHAM SILICA FIREBRICK COMPANY, LIMITED—Mr. George H. Johnston has been appointed managing director of the company, one of the Genefax group. General manager since 1954, Mr. Johnston started his career in the refractories industry at the silica brickworks of the Consett Iron Company, Limited, and the Newbould Silica Firebrick Company, Limited, Australia. He joined General Refractories, Limited, in 1934.

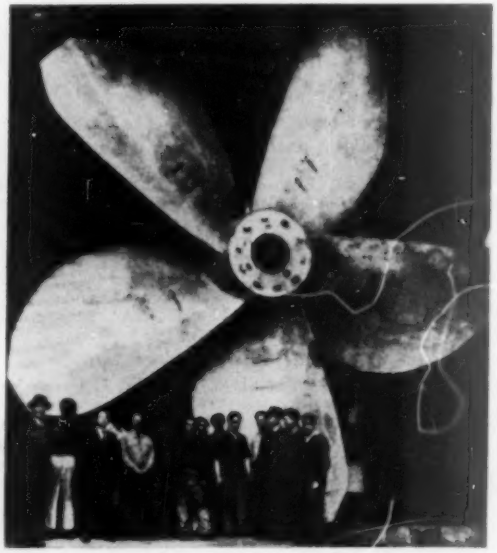
Book Review

Modern Furnace Technology (Third Edition), by H. and G. Etherington. Published by Charles Griffin & Company, Limited, 42, Drury Lane, London, W.C.2; price £6 2s. 0d., post free.

This new edition of what has become a standard textbook on combustion shows some improvements on the previous editions. Many problems connected with combustion and heat-transfer are often deemed to be too complex for the works' engineer who although not trained to deal with the subject finds that it is thrust upon him. The solutions to many such problems are stated in this textbook in simple terms and explained in a way that requires little or no prior knowledge of the subject. The new introductory chapter on the description and classification of furnaces is, however, somewhat over simplified to be of any real value and one cannot expect a chapter on refractories (which runs merely to 50-odd pages) to give more than the most-elementary information. One feels that the book would be better without these two descriptive types of chapters and if instead it dealt solely with the mathematics and calculations of combustion, and included such other technical information that may be necessary to deal with these aspects. The reviewer finds the mixture of the first and third person rather aggravating although the inclusion of the first person does not detract from the merits of this work as a textbook for the student or a help-out for the engineer.

T. A. COSH.

This propeller, claimed to be one of the largest ever made, was manufactured by Société des Forges et Chantiers de la Méditerranée, of France, for the 73,800*-ton tanker "J.-Paul Getty," which was built for the Tidemar Company of Liberia by the Ateliers et Chantiers de France. Made of high-tensile brass, its diameter is* 7½ *metres* (25 *ft.*), *and its net weight after machining* 44 *tons.*



American Letter

AFS Regional Conference

The 24th annual Wisconsin Regional Foundry Conference of the American Foundrymen's Society was held in Milwaukee, and about 600 members and guests attended the 20 technical sessions. Subjects covered in the technical sessions included heat-treatment, analysis, casting quality, machinability, melting, corebinders, etc., and what follow are some of the main points which arose out of a selection of the papers presented.

In a paper on "Pneumatic Chip Injection by the Roxy Process," Mr. G. W. Anselman said that the proper place to inject was just above the melting zone (from the upper edge of the melting zone to about 2-in. above), as the atmosphere was almost neutral there. Also, borings melted rapidly without loss of silicon or carbon, other than the normal melting loss with top charging. Good cupola operation was a requisite and the composition of the borings must be known, as rusty or contaminated borings could cause trouble. With good control, he said that up to 10 per cent. of borings could be used without additional choke charge. The particle size of the chip did not effect the amount that could be put in, but not more than 60 per cent. should go through a 20-mesh screen. Very large chips might show a slight increase in silicon and carbon loss, and steel chips should be crushed.

Steel Castings

Sessions on steel castings concerned aircraft quality, temperature measurement, machinability and moulding, and in a paper on "Aircraft Quality," Mr. J. Varga Jr., of the Battelle Memorial Institute, described requirements for aircraft and aerospace steel castings. These included close dimensional tolerances, thin sections, good surface-finish and internal soundness. He said that the foundryman interested in producing aircraft-quality castings must know the capability of his own particular process and be able to state that he could produce the castings. Speaking on "What's New in Pyrometry," Mr. D. Johnston (of Wheelco Industrial Instruments Division, Barber-Colman Company) described the nature, application and limitations of permanent thermocouples and disposable-cartridge dip-sticks, and optical pyrometers. He said that total-radiation pyrometers were impractical for pots or crucibles because of slag formation, and they were at some disadvantage in pouring streams. He discussed the effects of emissivity on steel pouring temperatures in relation to the various types of pyrometers and the paper concluded with a description of the recorders used with different pyrometers. In a paper entitled "Recent Innovations in Steel Moulding," Professor R. W. Heine (University of Wisconsin) said that no new materials were seen as becoming available for steel moulding, but better use of known materials was probable. In this category, he said, was more use of chemically-bonded green sands, mould coatings and additives. There was likely to be increasing use of carbonaceous additives, such as 0.25 to 1.0 per cent. graphite. Better use would be made of green sand with better formulation of the materials. Requisites of a good mould were uniform bulk-density, high bulk-density, high mould-hardness and good mould edges, he concluded.

Non-ferrous Papers

Non-ferrous founders heard papers on air-setting cores, plastic corebinders and new light metals. Mr. E. Koglin (of G. E. Smith Company, Pittsburgh), speaking on "Air-setting Cores and Practices," said that cold or air-setting materials provided an answer to the foundryman's search for a sand binder which not only eliminated some of the rigours of core and mould making, but had easy shakeout and retained dimensions during baking. Advantages of cores made by the cold-setting process were enumerated as follow: (1) No ramming was necessary because of high flowability; (2) reduced rodding; (3) less skilled labour needed; (4) less finishing operations required; (5) uniform hardness; (6) reduced baking time; (7) faster closing of moulds and better shakeout, and (8) reduced rough cleaning of castings and lower machining costs. On the other hand, Mr. Koglin said that the sand mix had a limited life and the cold-setting process was limited to core production which normally required no more than six or eight cores per box.

"What a Foundry can Expect from a Plastic Corebinder" was the subject of a paper given by Mr. R. J. Handwerk (of the B. F. Goodrich Chemical Company, Cleveland). Acrylic-based materials, he said, were now being used by many foundries casting high-quality missile parts. Acrylic binders were liquids which were used much like a core oil, but they differed drastically from normal oils and resins in curing or hardening. They were solutions of a strong plastic dissolved in water and evaporation of the water was all that was required for hardening. Cores could be baked in an oven at a normal temperature range or with infra-red bulbs, or in any other manner to remove the water. Advantages claimed for acrylic binders included closer casting tolerances, better surface-finish, excellent collapsibility, and knockout, no obnoxious odours or fumes, unlimited storage life, fast baking, better tolerance to overbaking, and good hot-strength.

Malleable Sessions

Malleable sessions at the Conference considered coresand practice, induction melting, and included the showing of a film of the mechanized foundry of the Link-Belt Company, Indianapolis. Mr. D. Dalton (of Thiem Products Inc., Milwaukee) gave a paper on "Coresand Practice for the Malleable Iron Foundry" in which he said that by controlling the variables in oil-sand mixtures, a foundry could gain many benefits. Grain size could be adjusted by blending two or more sands, and dry sand should be used in formulating the mixture, and the formulation should be on a weight basis. Cereal and clay provided green strength, and oil provided hot and dry strength; the use of wood flour reduced sand expansion. Mr. C. F. Smith (of I-F Manufacturing Company, New Philadelphia) presented a paper on "Induction melting of Malleable Iron" and described the operation using three 5,000-lb. capacity, line-frequency induction furnaces which melt 24 hours per day, six days a week. He said they were held under low power over the weekend. The furnaces described melt at the rate of 1,200 lb. per hour on a cycle which includes removal of 400 lb. molten metal every 20 min., and immediately recharging with the same amount of cold material. Metal temperature averaged about 1,590 deg. C.

Patternmaking Developments

In another technical session, patternmakers discussed developments in plastic and plaster, heated corebox equipment and cast-to-size patterns, and one of the papers presented was entitled "New Developments in Plastic and Plaster" and was given by Mr. S. Munson (of Ren Plastics Inc, Lansing, Michigan). He said that several epoxy plastic materials used in planking, paste and liquid form were suitable for patterns and coreboxes. These dimensionally-stable, thermo-setting resins were used as laminating or casting materials. They were light in weight, needed no special storage

American Letter

or refrigeration, set at room temperature, would bond to almost any material, and had good ductility. They also lend themselves well to the modification or repair of patterns and tools, he concluded. Mr. H. R. Bilter (of International Harvester Company, Milwaukee) showed a series of slides of specially-designed core-making machines featuring built-in heating devices for curing cores made with furane or other type resin binders.

Personal

Mr. R. W. FLUX has joined the board of Bruce Peebles & Company, Limited.

Mr. GORDON HARRIES, secretary of Firth Cleveland, Limited, has been elected to the board.

Mr. L. KLEIN has been appointed sales director of Air Pumps, Limited, Raynes Park, London.

Mr. H. CLARKE has been appointed assistant managing director of Qualcast, Limited, as from July 1.

Mr. T. E. GRAY has taken up an appointment with W. & C. Spicer, Limited, The Grange, Kingham, Oxon.

Mr. W. MILLS has been appointed secretary of the northern division of the Traders Road Transport Association.

Dr. A. R. PINNINGTON has been appointed sales manager (development) of the Fuller's Earth Union, Limited, a member of the Laporte group.

Mr. ALLEN L. STOCK, chairman of the Morgan Crucible Company, Limited, has been re-elected chairman of the London Chamber of Commerce.

Mr. S. C. SEWARD, managing director of Platt Bros. (Sales), Limited, has been appointed chairman of Dobson & Barlow Machinery Sales, Limited.

Presentation of a cheque has been made to 63-year-old Mr. J. SHAW to mark completion of his 50 years' service with Geo. Salter & Company, Limited, West Bromwich.

Mr. E. PHILLIPS, managing director of Thomson Bros. (Bilston), Limited, has been appointed chairman of the company in succession to Mr. H. J. THOMPSON who has retired.

Mr. R. F. G. LEA, deputy chairman and joint managing director of CIBA (A.R.L.), Limited, Duxford, Cambridge, has been appointed a director of CIBA Clayton, Limited, Manchester.

Commercial director of Platt Brothers & Company, Limited, Oldham, Mr. E. E. RUSHTON has been elected president of the Manchester branch of the Institute of Cost and Works Accountants.

Mr. R. E. LEAPINGWELL, a director of Aiton & Company, Limited, pipe engineers, of Stores Road, Derby, has been re-elected vice-chairman of the committee of British Employers Operating Abroad.

Mr. COLIN BIRD, who has been with the Doncaster factory of International Harvester Company, Limited, for 11 years, has taken up a post in the planning department of Vickers-Armstrongs, Limited, at Weybridge, Surrey.

Mr. ALFRED H. MUNKENBECK, JR., has been elected president of Brakeshoe International, S.A. He will have full responsibility for the administration of the company, which is a subsidiary of the American Brake Shoe Company.

Mr. L. T. HINTON, of Standard Telephones & Cables, Limited, has been elected chairman of the Federation of British Industries' contracts committee. He succeeds Mr. E. G. BATT, who held the position for 15 years and has resigned owing to ill health.

Mr. OSSIAN PORTER, managing director of Wilson & Longbottom, Limited, loom manufacturers, Barnsley, and his son, Mr. IAN PORTER, technical director of the firm, have been appointed to similar positions with Butterworth & Dickinson, Limited, of Burnley.

Mr. W. S. HORWOOD has been appointed assistant education and technical officer to the Institution of Production Engineers, and has taken up his duties at the Institution's headquarters in London. Mr. Horwood, who comes from Australia, holds a bachelor's degree in industrial engineering of the University of New South Wales.

Mr. P. SAPIR, Minister of Trade and Industry for Israel, visited the works of Samuel Osborn & Company, Limited, Sheffield, on June 8. He was welcomed by Mr. F. A. Hurst, chairman of the company, and Mr. C. F. Hurst, deputy chairman. Others in the party were Mr. A. KRAUSZ, Mr. A. HAGGIN and Mr. Z. EADON.

Dr. F. R. HENSEL, internationally known in metallurgy and research administration and until recently vice-president of engineering of P. R. Mallory & Company, Inc., Indianapolis, Indiana, has joined the Clyde Williams & Company, Columbus, Ohio, and its associated technical, management services, and financial enterprises.

Elcontrol, Limited, announce that Mr. E. R. THOMAS has decided to retire from full-time executive duties and has accordingly resigned as managing director, but is remaining a director of the company. Mr. B. A. WORSWICK, who has been chief engineer and technical director for the past 18 months, succeeds him as managing director.

Mr. H. M. M. HYSLOP is to become chairman of the Scottish Machine Tool Corporation after the company's annual meeting on July 13. He continues as managing director and succeeds Mr. DOUGLAS SHARP, who is resigning as chairman but remains on the board. Mr. DAVID PATRICK is not seeking re-election and will retire from the board at the meeting.

British Iron and Steel Research Association announces the appointment of Mr. B. H. TRIPP, M.I.P.R., as editor of its internal and external publications concerned with research work in the steel industry. Mr. Tripp has, since 1952, been Press and publication officer of the Joint Iron Council, a body representing foundry iron producers and ironfounders in the United Kingdom.

Mr. G. A. LOMAS, managing director and deputy chairman of J. & J. Dyson, Limited, refractories, Stannington, near Sheffield, has been elected president of the Refractories Association of Great Britain. He studied refractories in the Faculty of Metallurgy at Sheffield University and after service in the Royal Air Force returned to Dyson's with a seat on the board.

Mr. HANS THULIN, 21-year-old apprentice with Swedish Air Services, and Stockholm's "Apprentice of the Year," is due to arrive in Sheffield to-day for a fortnight's tour of Sheffield industries. He is the guest of the Sheffield Junior Chamber of Commerce who have been responsible for the visit in return for the hospitality shown to Sheffield's Apprentice of the Year in 1960 by Stockholm Junior Chamber of Commerce.

Translation Service

From amongst the most recently published lists of translations available from the Iron & Steel Institute (4, Grosvenor Gardens, London, S.W.1), the following have been selected as being of interest to founders. The price quoted is that for single copies, postage extra, there being reductions for quantities ordered. Readers writing for translations, or for further information, should mention this JOURNAL when doing so.

BISI 1806 INFLUENCE OF THE MODE OF COMBINATION OF AN ELEMENT ON ITS DETERMINATION BY EMISSIVE SPECTROGRAPHIC ANALYSIS. (From German.) Dickens, P., and A. Bahr. *Arch Eisenhüt*, 1960, *31*, Mar., 135-143. (£6.) The non-ferrous example used in the investigation was Al, in the two forms of Al/Cu alloy and Al_2O_3. Excitation behaviour was examined. (21 refs.) (*JISI* abstract 1960, Dec., 495c.)

BISI 2017 A NEW METHOD FOR THE ANALYSIS OF CARBIDES IN STEELS. (From Czech.) Brhacek, B., *et al. Hutn. Listy* (Prague), 1960, *15*, (9), 679-686. (£6 15s.)

BISI 2057 EVALUATION OF TESTING METHODS FOR NON-METALLIC INCLUSIONS IN CARBON STEEL—Ck 22. (From German.) Eckstein, H.-J., and K. Schneider. *Neue Hütte*, 1960, *5*, Oct., 607-17. (£6.)

BISI 2063 RECOVERY OF CHROMIUM FROM SLAGS OBTAINED WHEN MELTING STAINLESS-STEEL SCRAP IN THE ARC FURNACE USING OXYGEN. (From Czech.) Chovjka, J. *Hutnick* (Prague), 1960, *10*, (1), 2-5. (£3 5s.) Chromium can be recovered for further use in alloy steel by adding Cr-bearing slags to reducing slags of melts in alloy-steel production. In this way the Cr is utilized without a deterioration in the steel. The method of salvaging Cr is cheap to introduce. In the author's experiments, carried out in a 2-t basic electric arc-furnace, Cr ores containing 37 per cent. Cr_2O_3 and hence 25 per cent. Cr, were successfully utilized. The experiments and results obtained are discussed. (*JISI* abstract 1960, Oct., 232c.)

BISI 1991 USE OF RADIOISOTOPES IN METALLURGY AND METAL PHYSICS. (With bibliog. 317 refs.). (From German.) Kulikow, I. S. *Neue Hütte*, 1960, *5*, June, 348-354; July, 420-425. (£7 5s.) A review of the literature dealing with the use of radio-isotopes in studying the theory and practice of metallurgical processes, investigations on metallurgical plants, distribution and segregation of elements in metals and alloys, of diffusion and autodiffusion in solids, and quality control of metallurgical processes. (*JISI* abstract.)

BISI 2040 DEOXIDATION OF IRON BY MELTING UNDER VACUUM. (From French.) Turillon, P. *Rev. Mét. Mém. Sci.*, 1960, *57*, Sept., 649-657. (£3 5s.) An experimental study of the deoxidation of pure iron by vacuum-induction melting. It is shown that a kinetic equilibrium exists between deoxidation and reoxidation from the crucible materials, at the stage where the concentration of C and O_2 are at a minimum ($C = 0.006$ per cent. and $O_2 = 0.0012$ per cent.). (14 refs.) (*JISI* abstract.)

BISI 2059 DETERMINATION OF GASES IN METALS BY THE HOT-EXTRACTION PROCESS USING GAS CHROMATOGRAPHY. (From German.) Lesser, R., and H. Gruber. *Z. Metallk.*, 1960, *51*, Sept., 495-501. (£3 15s.)

BISI 1835 INVESTIGATIONS INTO THE RECRYSTALLIZATION OF A FERRITIC 27 PER CENT. Cr STEEL WITH SPECIAL REFERENCE TO ANNEALING TIME (with Bibliography, 35 refs.). (From German.) Borchers, H., et al. *Arch. Eisenhütt.*, 1960, *31*, Mar., 177-182. (£4.) The importance of taking into account the effects of annealing time in studying recrystallization is discussed, and the results of harness measurements and microscopical examination of a cold rolled 27 per cent. Cr steel given a recrystallizing anneal are described. The results discussed are: hardness after a 24-hr. heat-treatment at 200-500 deg. C. and at 500-1,200 deg. C. for up to 2 hr. as a function of degree of working (up to 70 per cent), and grain-size after heat-treating at 600 to 1,300 deg. C. as a function of degree of working and duration of annealing. (*JISI* abstract 1960, Dec., 489b.)

BISI 2105 INFLUENCE OF SMALL AMOUNTS OF NICKEL AND CHROMIUM ON THE MECHANICAL PROPERTIES OF STEEL. (From Japanese.) Ohtake, T., et. al. *Tetsu to Hagane*, 1959, *45*, Sept., 1089-92. (£8.) Results are given for the effects of up to 0.5 per cent. of the combined elements on tensile and impact properties and transition temp. of 0.1 and 0.6 per cent. C steels. (*JISI* abstr.)

BISI 2109 IMPORTANCE OF NOISE MEASUREMENT FOR THE EFFECTIVE ABATEMENT OF NOISE NUISANCE IN THE IRON AND STEEL INDUSTRY. (From German.) Schulz, G. *Stahl Eisen*, 1961, *81*, Feb. 15. 220-8. (£5 15s.)

BISI 2113 REPORT ON EXPERIENCE WITH THE MEASUREMENT OF BLAST-FURNACE LINING WEAR BY MEANS OF RADIO-ACTIVE ISOTOPES. (From German.) Flossmann, R., and R. Geidel. *Stahl Eisen*, 1960, *80*, Nov. 24, 1753-59. (£4 10s.)

BISI 2152 PHYSICAL PROBLEMS IN THE CONVEYING OF SOLID PARTICLES IN LIQUIDS AND GASES. (From German.) Barth, W. *Chemie-Ingenieur-Technik*, 1960, *32*, Mar., 164-171. (£3 15s.)

New translations in course of preparation include:

BISI 2166 NITROGEN DETERMINATION IN STEELS, IRONS AND FERRO-ALLOYS. (From French.) Calmettes, J., and H. Guinot. *Rev. Mét.*, 1960, *57*, Oct., 925-34. (Included in response to requests—Form C 108.)

BISI 2167 ANALYSIS OF HYDROGEN, OXYGEN AND NITROGEN IN METALS BY MELTING UNDER REDUCING CONDITIONS IN AN ARGON ATMOSPHERE. (From French.) Hancart, J., and J. Marot. *Rev. Mét.*, 1960, *57*, *Oct.*, 911-17.

BISI 2174 APPLICATION OF GAS PHASE CHROMATOGRAPHY TO THE DETERMINATION OF HYDROGEN, NITROGEN AND OXYGEN IN STEELS AND CAST IRONS. (From French.) Tyou, P., and A. Hans. *Rev. Mét.*, 1961, *58*, Feb., 187-193.

BISI 2216 PETROGRAPHIC INVESTIGATION OF CONVERTER SLAGS FORMED DURING THE TOP BLOWING OF METAL WITH OXYGEN. (From Russian.) Karyakin, L. I., and E. V. Ivanov. *Ogneupory* (Moscow), 1959, *3*, (10), 455.

BISI 2218 SULPHUR METHOD OF DETERMINING OXYGEN (OXIDES) IN METALS. (From Russian.) Babko, A. K., *et al. Zavods. Lab.*, 1956, (6), 640-645.

BISI 2224 ABSORPTION AND ESCAPE OF HYDROGEN IN IRON AT HIGH TEMPERATURES. (From Swedish). Pihlstrand, F., *Jernkont. Ann.*, 1937, *121*, (5), 219-231.

BISI 2219 DETERMINATION OF THE RATE OF HYDROGEN DIFFUSION IN METALS. (From Russian.) Ryabov, R. A., and P. V. Geld. *Ibid.*, 1958, (3), 306-308.

BISI 2226 BEHAVIOUR OF HEAT-RESISTANT STEELS AT HIGH TEMPERATURES AND AFTER LONG PERIODS OF STRESS. (From German.) Stauffer, W., and A. Keller. *Escher Wyss Mitteilungen*, 1957, (2), 3-18.

BISI 2236 INVESTIGATIONS AT THE INSTITUTE FOR FERROUS METALLURGY AK. NAUK. UKRAINE. (From Russian.) Nekrasov, Z. I., *et al. Stal'*, 1957, (5), 468-9.

Other People's Translations

The initials PST, etc., stand for the organization to which enquiries for the following translations should be made; quoting the reference numbers. Addresses are given at the end of the list.

PST 398 PROTECTION OF METALS FROM CORROSION; WEAR-RESISTING FINISHING AND PROTECTIVE COVERINGS. Peredovoy nauchno-technicheskii i proizv. opyt. (Advanced Scientific Technical and Industrial Experience) collection 1; Tema 13, No. 58-19/2.

TESTING THE ABRASION RESISTANCE OF METALLIC SHOTBLASTING MEDIA. Bickel, E. *Stahl u. Eisen*, 1960, *80*, Dec. 22, 1944-1948. Abridged trans. in *Engineers' Digest*, 1961, *22*, March, 79-81, 84.

INFOSEARCH. ZH-58/12.20 IMMERSION THERMOCOUPLES. Danishevskii, S. K. *Zavods Lab.*, 1958, *24*, (12), 1470-5.

MT 179 EFFECT OF HEAT-TREATMENT ON THE MECHANICAL PROPERTIES OF 13-PER-CENT. CHROMIUM STEELS. Drapal, S. *Hutnicke Listy*, 1961, *16*, (2), 120-128. (In preparation.)

BCIRA 989 RESEARCH ON THE RELATION BETWEEN CAST IRON AND OXYGEN. PART 1: EFFECT OF OXYGEN CONTENT IN CAST IRON AND ITS STRUCTURE. PART 2: SOME CONSIDERATIONS IN CONNECTION WITH THE STRUCTURAL CHANGES BY OXYGEN. Homma, M., and Y. Hashimoto. *Nippon-Gakkhai-Shi*, 1952, *16*, 486-92; 547-51.

BCIRA 990 ACCURACY IN COREMAKING USING CONVENTIONAL EQUIPMENT WITH SYNTHETIC RESINS AS BINDERS. Roth, J. *Fonderie*, 1960, (177), Oct., 409-418.

DSIR CTS 601 LC, SLA 60-23984 CAST-STEEL ROLLS FOR ROLLING MILLS. Saveyko, V. N., and M. V. Frolova. *Stal'*, (USSR), 1958, *18*, (2), 179-185. (mi. $1.80, ph. $1.80).

BCIRA 988 PRODUCTION OF HIGH-STRENGTH CAST-IRONS BY ALLOYING WITH NITROGEN INTRODUCED BY MEANS OF CALCIUM CYANAMIDE. Volianik, H. *Fonderie*, 1960, (175), Aug., 307-324.

Sources of Translations

INFOSEARCH: Infosearch Limited, 242, Willesden Lane, London, N.W.2. MT: M. de O. Tollemach, The Old Rectory, Lewknor, Oxon, and BCIRA; British Cast Iron Research Association, Bordesley Hall, Alvechurch, Birmingham. PST: Program for Scientific Translations, 14, Shammai Street, P.O. Box 7145, Jerusalem, Israel. DSIR: Department of Scientific and Industrial Research, 20, Chester Terrace, London, N.W.1.

The following translation is available from Mr. H. Brutcher, P.O. Box 157, Altadena, California, USA.

HB 5125 Computer Calculation of Temperature Distribution in Cupolas. Marienbakh, L. M., and A. M. Shapiro. Lit. Proizv. 1960, Sept. 35-28.

News in Brief

NEW ADDRESS of the National Council for Technological Awards is 24, Park Crescent, London, W.1.

STEEL & COMPANY, LIMITED, Crown Works Sunderland, have moved their London headquarters to Steel House, Eastcote, Pinner, Middlesex.

THOS. FIRTH AND JOHN BROWN, LIMITED, have presented a copy of their sound film, "Firth-Brown Forged Steel Rollers," to Sheffield Corporation for the city archives.

AN ERROR appeared in the report, in our June 15 issue, of the "Open Day" at the National Foundry College. The annual production of steel castings in this country is 300,000 tons and not 130,000 as printed.

A MEETING HAS BEEN HELD IN SYDNEY between the officers of the main foundry technical institutes, with the objective of the formation of a national Australian body for the whole of the Australian foundry industry.

THE SECOND CONGRESS of the International Federation of Automatic Control (IFAC), will be held in Basle, Switzerland, in September, 1963, at the invitation of the Swiss Association for Automatic Control.

WILSON CRUCIBLE COMPANY, LIMITED, 16, Philpot Lane, London, E.C.3, has taken over the sale of plumbago crucibles, anodes, graphite plates, etc., hitherto dealt with by T. S. Wilson & Company (Graphite), Limited. The latter firm will continue to specialize in the supply of plumbago, graphite, blacklead and colloidal graphite. Mr. A. R. Wilson will be chairman and managing director of both companies.

COST OF LABOUR TURNOVER will be the subject of a one-day conference of the British Institute of Management to be held at the Connaught Rooms, Great Queen Street, London, W.C.2, from 10 a.m. to 5 p.m., July 4. Speakers will include Dr. A. F. Badger, industrial relations officer of the Gas Council, Mr. F. M. Baker, chief accountant of the Marley Group, Mr. J. Bridges, personnel manager, Walls Ice Cream, Limited, and Mr. R. K. Bremer, internal consultant, Richard Costain, Limited.

A NEW IRON-ORE CONCENTRATING MILL, built at a cost of £500,000 by the Sierra Leone Development Company, Limited, was recently put in operation at Marampa. A Barclays Bank D.C.O. report states that the new mill is expected to step up production at the mines from 1,500,000 to 2,000,000 tons of iron ore per year, and plans had already been laid for a further mill to be completed by 1964 which would have even greater capacity. The port of Pepel would be expanded to facilitate the greater production which is planned.

THE FOUNDRY at the Leven shipyard of William Denny & Brothers, Limited, has been included in the firm's £1,000,000 modification scheme. Operated by a subsidiary undertaking, Hardie & Gordon, in conjunction with Dennys, the foundry is turning out Doxford-type cylinders for diesel engines—750 have been sold. The plant manufactures iron castings up to 30 tons for marine and land use and bronze and brass castings up to 15 cwt. Over the period of modification the foundry has turned out 6,000 tons of iron castings and 160 tons of non-ferrous castings.

HALIFAX TOWN COUNCIL members were told at the June meeting of complaints by residents of noise nuisances from the factory of Hattersley (Ormskirk), Limited, brassfounders, Hopwood Lane Works, Halifax. Alderman F. H. Swire, who was asked if he was aware of the concern which had led to the sending in of a petition signed by 160 residents, detailed the complaints over a period going back to August, 1959, also the measures taken by the firm to overcome the difficulties. He said he was satisfied the company was co-operating with the Health Department in every possible way.

THE NATURAL GAS INSTALLATIONS at Whitby, East Yorkshire, were inspected by 130 members of the Manchester and district section of the Institution of Gas Engineers on June 16. At Aislabyside, the site of Well E2, which is among the sources of natural gas piped to Whitby gasworks, Mr. E. Adcock, of Eakering, Notts, explained that the well supplied gas from a depth of 4,200 ft. and was connected by pipeline to the well at Grosmont, which operated to a depth of 4,800 ft. The town was the only one in Britain entirely dependent on natural gas for all its gas supplies.

SHORTAGE OF LABOUR IN ENFIELD, MIDDLESEX, has forced Sangamo-Weston, Limited, instrument makers, to transfer the entire manufacture of time switches to their factory at Port Glasgow. These works which are already doing some of this trade, are to be expanded at a cost of £150,000. It is expected that more jobs will be available there. The freed space at Enfield will allow the factory there to increase its output of indicating instruments and other equipment. Greenock, Scotland's unemployment "black spot," is to ask the Secretary of State for Scotland to back its bid for a factory.

AT THE FIFTH ANNUAL GENERAL MEETING last month of the Electric Steel Makers' Guild at Rowton Hall Hotel, near Chester, Mr. W. Keen of Jessop-Saville, Limited, was elected president, Mr. R. S. Howes (Steel Peech & Tozer), vice-president, and Mr. F. Crankshaw (K. & L. Steelfounders and Engineers, Limited), secretary and treasurer. Following the meeting, members of the Guild visited Brymbo Steelworks, Limited, near Wrexham, the itinerary including a tour of the melting shop where the company's oxygen/electric process was in operation. Luncheon was at the invitation of the company.

SMITH & WELLSTOOD, LIMITED, Bonnybridge, have announced to the Stock Exchange that they have acquired for £50,000 together with further sum for stock at valuation, from R. F. Morrison & Company, Limited, Glasgow, their factory at Scotts Road, Paisley, for the manufacture of ceiling tiles and other acoustic materials. Smith & Wellstood manufacture cooking and heating appliances and the new acquisition follows a policy in diversification, the business of Gardiner & Guiland, Limited, London, manufacturers of industrial catering equipment having been purchased two years ago.

STEEL, PEECH & TOZER (branch of the United Steel Companies, Limited) has placed an order with the gas cleaning division of W. C. Holmes & Company, Limited, Turnbridge, Huddersfield, to supply gas-cleaning plant for each of the first two furnaces of the six 110-ton capacity electric-arc furnaces which are to be installed at their Templeborough Works. Each gas-cleaning installation consists of a direct fume-extraction system, an electrical precipitator and a common water-treatment plant. Completion of the first insallation is scheduled for October 1, 1962 and the second for February 1, 1963.

POWER-GAS CORPORATION, LIMITED, a member of the Davy-Ashmore Group, have secured a £1,500,000 contract for Poland against stiff competition from European and American firms. It is for a plant which

can produce 500 tons a day of specialized product for fertilizer use. It is the first contract ever gained by the company for Poland. The plant will employ a special Japanese process which has been licensed to Power-Gas and this will be its first application in Europe. The contract has been taken on a deferred-payment basis and follows a recent order gained by Power-Gas for process plant to be built in Russia.

A DRAFT ORDER IN COUNCIL, the Merchandise Marks (Imported Goods) No. 4 Order, 1928, Amendment Order, 1961, which was laid before Parliament on June 16, exempts any imported ball or roller bearing of outside diameter not more than 12.7 mms. from having itself to bear an indication of origin, but requires that the indication shall be printed or stamped on its wrapper or container. The Order is intended to amend the Merchandise Marks (Imported Goods) No. 4 Order, 1928 (S.R. & O. 1928/1047). Copies can be obtained from HM Stationery Office, Kingsway, London, W.C.2, and branches, or through any bookseller, price 3d., by post 5d.

FOLLOWING TRADE NEGOTIATIONS in London and Warsaw, new quota lists for the 12 months from July 1, 1961 to June 30, 1962, have been agreed. United Kingdom exports to Poland in the 12 months are estimated to reach £24,000,000, an increase of £8,000,000 on the level expected to be achieved in 1960/61. Polish exports to the United Kingdom are estimated at £39,000,000, an increase of £1,000,000 on the current level. The quota list for United Kingdom exports to Poland includes capital goods, machinery and equipment, chemicals and basic materials and other goods including consumer goods. The quota list for United Kingdom imports from Poland includes foodstuffs, chemicals and manufactured goods.

SMITH & DAVIS, LIMITED, brassfounders, Beacon Works, Friar Park Road, Wednesbury, Staffordshire, has celebrated its 60th anniversary with a dinner to 70 long-service and retired personnel. All the guests had at least 21 years' service. Mr. L. Leonard Davis, chairman and managing director of the company, presented a gold watch to Mr. R. Millington, the firm's north of England representative. This was the 89th gold watch to be presented to employees since the company was founded. A surprise presentation was also made to Mr. Davis by the guests in recognition of his 50 years with the company. The original partnership was started in 1901 by F. C. Smith and F. N. Davis. The present directors are F. Leonard Davis, P. P. Richards, A. Howard-Smith, J. P. Davis and R. M. Daffurn (secretary).

A MODEL OF A HYDRO-REFINING PLANT designed by the engineering division of Newton Chambers & Company, Limited, and made at the Chapeltown works, near Sheffield, has been sent to Paris to the Société pour l'Equipment des Industries Chimique (Speichim) with whom the firm has a reciprocal agreement. It is to be shown at the French Trade Fair in Moscow in August. By the agreement with Speichim, Newton Chambers possess the sole licence in the United Kingdom for the manufacture, sale and installation of plant and equipment for the treatment of alcohol, coal by-products, fats and oils, and all types of distillation plant to the Barbet design. The British firm has world rights for the manufacture of plant to operate a process of hydro-refining crude benzole, napthas and other hydrocarbon oils. The process resulted from research in which Newton Chambers co-operated with the Coal Tar Research Association. A pilot plant was constructed and operated at the Thorncliffe Works.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d.)

842,158. Misco Precision Casting Company, Whitehall, Michigan, USA.

Apparatus and process for casting titanium and related metal and their alloys, *i.e.*, those in Group IVA of the Periodic Table. Particular claims are made with respect to shell and investment casting techniques. The mould body is formed with silicon oxides. The mould cavity is lined with a thin (0.000001 to 0.0003 in.) continuous barrier film of a metal or alloy from the above mentioned group.

842,380. Die Casting Machine Tools, Limited, and A. R. Mills, River Works, 152, Green Lanes, Palmers Green, London, N.13.

Fluid-pressure operated die-casting machines, presses, and moulding machines, with improved safety arrangements.

842,441. United Kingdom Atomic Energy Authority, London.

Improved methods of casting metal around a metal object without the use of stringers which would normally produce discontinuities in the outer cast-metal coating.

842,522. Hermann Klaue, Uberlinger/Bodensee, Germany.

One-piece cast bicycle frame made of light metal. Casting apparatus for the production of the frame is also claimed.

842,564. Foundry Equipment, Limited, and A. S. Beech, Linslade Works, Leighton Buzzard, Beds.

Apparatus for feeding mould boxes into and out from a moulding machine. A receiving station for empty mould boxes is located on the inlet side of the patternplate of the moulding machine. A guideway extends from this station in line with it so as to pass beyond the patternplate when in place. A pressure-fluid operated reciprocating feed device on the guideway has spaced feed arms to releasably engage and simultaneously move both a completed box from the moulding machine, and a further mould box into the machine from the receiving station.

842,570. E.M.B. Company, Limited, Moor Street, West Bromwich, Staffs.

The object of this Patent, for metal die-casting machines, is the elimination of the risk of injury to the moulds or to the machines, which may result because flash adheres to the mould.

843,959. Regie Nationale des Usines Renault, 8-10 Avenue Emile Zola, Billancourt, Seine, France, and Société des Hauts-Fourneaux et Forges D'Allevard, 12 Rue de la Rochfoucauld, Paris, France.

Pressure-die-casting machines.

843,975. Metropolitan-Vickers Electrical Company, Limited, 33 Grosvenor Place, London, S.W.1 (proceeded with in the name of Associated Electrical Industries, Limited, of the same address).

Improvements in vacuum and inert-gas casting methods.

844,113. Georg Fischer A.G. Schaffhausen, (Schweiz), Switzerland.

A method of filling a chill mould with molten metal, for the production of castings—in particular of samples for analysis. Apparatus is also claimed for carrying out the method, together with chill moulds for use in the method.

Gap in Management Training

There are insufficient training facilities for supervision in the field of management, said Mr. Paul K. Digby, management economics manager of the Production Engineering Research Association, at a conference of 160 Yorkshire members of the Institute of Industrial Supervisors held at British Acheson Electrodes, Limited, Wadsley Bridge, Sheffield, on June 18. He said, "There is a paramount need for more universities to realize that only by training managers as they train engineers and others can they expect to provide the country with the means for the co-ordination of improved technology.

"With the employment of specialists for many more functional services, the senior supervisory levels have increasing problems, since the more specialized a man becomes, the less he tends to be aware of the impact of his work on others. Therefore, unless senior management are fully aware of how modern techniques in management may be used, they will not be able to direct the specialist in the best manner."

Mr. J. Ekins, supervisor of management studies at Sheffield College of Commerce and Technology, spoke on the social aspects of supervision. The Lord Mayor of Sheffield, Alderman J. W. Sterland, welcomed the conference, and among those present was the Master Cutler, Mr. C. H. T. Williams.

Quicker Information on Stock Changes

An appeal for the speed up of returns of statistics, particularly statistics of stocks, is being made by the Board of Trade to industrial firms. The BoT point out that if Government action is to be timely and well informed, if business is to get maximum value from the cost it incurs in providing statistics, and if comments are to be pertinent, statistics must appear promptly. This is particularly important in the case of stocks, since the value can change rapidly and rather unpredictably, also the information is important for the proper interpretation of other information about the country's economy. The first quarterly stock estimates cannot be made until 10 weeks after the end of the quarter so that the saving of days is a worthwhile objective. While many companies do provide statistics promptly, it is hoped that those who take somewhat longer will find some improvement possible.

Lodge-Cottrell Contract

The land boiler consortium, Foster Wheeler-John Brown, Limited, has, on behalf of the Central Electricity Generating Board, instructed Lodge-Cottrell, Limited, a member of the Simon Engineering, Limited, group to supply precipitators for four 350mw boilers at Tilbury power-station. The contract value is about £1,100,000.

The flue dust produced by the four pulverized fuel-fired boiler units will be partially removed by mechanical collectors, and final cleaning will be carried out of 12 electro-precipitators, three to each unit. Each precipitator will be of the three-stage, horizontal gas flow, high-efficiency design and each group will handle 990,000 cu. ft. of gas per minute (continuous maximum rating) at 270 deg. F. with a guaranteed collecting efficiency of 99.3 per cent.

A further five precipitators for the Lackenby steel plant oxygen-blown open-hearth steel furnaces of Dorman, Long & Company, Limited, are to be supplied by Lodge-Cottrell. This makes a total of six furnaces to be supplied with precipitators at a contract value of some £440,000. Plant for each furnace will consist of one four-stage horizontal flow high-efficiency electrofilter, together with all the necessary transformer rectifier equipment, etc.

Falkirk Foundry Expansion

Production capacity is being further increased at the Grange-Camelon Iron Company's works at Falkirk to cope with the rising demand for the products of the recently-formed Sofono Electrical Division of Federated Foundries, Limited. These include the "Spacemaster" range of domestic convector heaters, reflector heaters, infra-red heaters for both home and industrial use, and the new "Sofonoflame" coal and log-effect fire.

A new chrome-plating department and assembly shops for convector heaters are scheduled to be in full production within the next few weeks. Extensions already completed include a stove enamelling shop, whose infra-red oven is the largest of its kind in Scotland and one of the largest in the UK, and shops for the assembly of infra-red fires and heaters. The extensions have been planned so that incoming materials for all appliances are received at a central depot, and fed directly to the various paint, plating and assembly shops.

43-year Presentation

After completing 43 years' service with Leyland Motors, Limited, Mr. C. C. Hodgson, A.MET., F.I.M. (left), has recently retired. At the time of his retirement Mr. Hodgson held the post of chief metallurgist with the company. In the accompanying photograph he is shown on the occasion of his being presented with an autographed album which formed part of his retirement gift. Seen making the presentation is Mr. W. West, deputy chairman of Leyland Motors, Limited, and managing director of West Yorkshire Foundries, Limited.

Publications Received

BCIRA Journal, Vol. 9, No. 2. Published by the British Cast Iron Research Association, Alvechurch, Birmingham.

From the reports appearing in this issue of the *Journal*, the following abstracts have been made:—

Report No. 585: Examining the Causes of Shrinkage Defects in Grey-iron Castings, by A. G. Fuller and K. E. L. Nicholas. This very practical report suggests that a measure of control for some lines of castings can be obtained by the systematic measurement of casting expansion or by weighing, this also applying to flywheels and nodular-iron crankshafts. An important part of the report is devoted to the use of the carbon equivalent content, with special reference to the phosphorus content. Pouring temperatures are next considered with the advice that there is for each casting an optimum pouring temperature which must strike a balance between shrinkage and the various other defects. Finally, much sound advice is given on control in the foundry.

No. 587: Graphite Injection through the Tuyeres of a Cold-blast Cupola, by H. J. Leyshon, R. B. Coates and K. E. L. Nicholas. A Patent application has been made by the Association in connection with this research. The authors have given their conclusions in the following statement:

A—Flake and nodular-graphite irons:

(1) Normal commercial ferro-silicon is a powerful inoculant due to the presence of aluminium and calcium dissolved in it.

(2) Inoculants containing either aluminium or calcium are less effective than those in which both elements are present.

(3) If the particle size of the ferro-silicon lies between about 12 mesh and ½-in. by ¼-in. little variation in inoculation is likely to occur as a result of changes in the size grading of the ferro-silicon.

(4) Increasing the carbon equivalent of the melt reduces the effectiveness of inoculation by normal ferro-silicon.

B—Flake-graphite irons only:

(5) Increasing calcium contents up to 7 per cent. in low-aluminium ferro-silicon give increasing inoculation and about 7 per cent. is high enough for general use.

(6) Mischmetal up to 0.04 per cent. of the iron, either by itself or added with ferro-silicon, gives good inoculation but the addition needs accurate control and may not be a practical proposition.

(7) Graphite is a very potent inoculant in flake irons both by itself and when added with ferro-silicon. Care must be taken to avoid too much carbon pick-up resulting from solution of the graphite, as a reduction in strength will result.

(8) Inoculation of irons of above 3.9 per cent. carbon equivalent value can cause a reduction in mechanical strength even though some increase in nucleation occurs.

(9) The degree of nucleation of the melt does not necessarily increase consistently with increasing carbon equivalent in batch-melted metal.

C—Nodular-graphite irons:

(10) Good inoculation is essential in the production of nodular irons to achieve the required structures and mechanical properties as cast.

(11) Increasing additions of normal commercial ferro-silicon give progressively increasing inoculation but only slight increases result from similarly increasing additions of low-aluminium ferro-silicon.

(12) Good inoculation is given by additions of SMZ alloy and fairly good inoculation is achieved by additions of calcium silicide giving equvalent silicon additions.

(13) Mechanical properties are markedly influenced by the carbon equivalent of the base iron, the tensile strength decreasing and the elongation increasing as the carbon equivalent increases.

(14) As the inoculation temperature and hence the pouring temperature decreases, the degree of nucleation increases.

(15) Superheating the melt has little effect on the resulting nodular iron.

D—These conclusions apply to nodular irons but for flake-graphite irons the converse is true:

(16) No inoculation is given by adding aluminium or calcium metal with the ferro-silicon.

(17) Fairly good inoculation is given by low aluminium ferro-silicon containing about 2 per cent. calcium but increasing the calcium content above this level progressively reduces the inoculation again.

(18) No inoculation is given by additions of mischmetal.

(19) Plunging crushed graphite has no inoculating effect.

No. 589: Practical Notes on Ram-off Defects, by A. A. Timmins and A. D. Morgan. In this report the authors state that castings which at first sight appear to be cross-jointed, may in fact be suffering from a "ram-off" defect. They detail some practical methods of investigating and curing this defect, and the pattern, moulding machine, moulding boxes and sand quality are dealt with separately. An example of the remedy found successful in a particular case is given, and it is emphasized that each case must be studied individually.

No. 590: Surface Carbide Formation in Blackheart-malleable Iron, by C. T. Moore. The Author has the following conclusions from his research, which he illustrates in his report with a series of excellent photomicrographs:—

(1) Surface carbides form by gaseous carburization of the iron surface with carbon monoxide during the second stage of annealing. In general, the carbon monoxide will develop as a result of the reaction of the atmosphere with carbon in the iron during the first stage of annealing, which slightly decarburizes the casting surface.

(2) If the annealing atmosphere is truly inert towards carbon during either or both stages of annealing, then surface carbides will not form.

(3) When white-iron castings are annealed in an air-tight container, the air present generates enough carbon monoxide during the first stage to cause surface carbides to form subsequently by carburization during the second stage of annealing.

(4) If, following the first stage and just prior to the second stage anneal, all the carbon monoxide is purged and replaced by air and the container resealed, then carbon monoxide will develop during the second stage but this will be associated with very slight decarburization and carbides will not form.

(5) Surface carbides may be avoided in practice by: (*a*) *Inert annealing*—This is carried out in production, and is necessary in continuous annealing practice, by supplying the furnace with an inert atmosphere. A suitable atmosphere is that developed in an exothermic town-gas generator where the products of combustion are controlled and cooled to provide a dry atmosphere that consists essentially of 98 per cent. nitrogen and about 1 per cent. carbon dioxide and 1 per cent. carbon monoxide. In order to achieve low carbon dioxide contents it is necessary to absorb this gas, and generally the atmosphere is also desulphurized before use. High hydrogen contents which retard annealability are avoided by using a high air:gas ratio in the town-gas

Publications Received

burner. (*b*) *Purging the atmosphere of carbon monoxide prior to second-stage annealing*—This is achieved naturally in the two-stage elevator electric annealing furnace. (*c*) *Maintaining a decarburizing atmosphere during second-stage annealing*—This can be achieved in the pack-annealing process by controlled introduction of air.

No. 591: An Improved Method of Desulphurizing Cast Iron with Sodium Carbonate, by R. B. Coates and R. Williams. The authors have furnished the following summary relative to this new development which has been the subject of a British Patent application:—

Sodium carbonate desulphurization of cast iron has been used for some 30 years and during this time a number of processes have been devised to promote intimate contact between metal and soda slag. An improved method has been developed at the Association which requires only a small capital expenditure on equipment and is simple and cheap in operation. The molten metal is tapped onto a bed of sodium carbonate and agitation is provided by compressed air introduced through a submerged lance. Using basic-lined vessels and metal temperatures before mixing of 1,400 deg. C., a 1 per cent. addition of sodium carbonate will enable an initial sulphur content of 0.15 per cent. to be reduced to below 0.01 per cent. The equipment is illustrated, results for acid and basic-lined ladles are tabulated.

Accidents—How They Happen and How to Prevent Them. No. 47. Published for the Ministry of Labour by Her Majesty's Stationery Office, York House, Kingsway, London, W.C.2; price 1s. 3d.

There is only one foundry accident reported in this issue. An improvised arrangement on a cupola consisting of a petrol drum to give added reach resulted in a fatality. The job being undertaken was the freeing of hoppers from awkward shapes of scrap. Improvisation of any kind should be eliminated at the first possible moment, whereas this one—unauthorized and unorthodox—had apparently been used for some time. It is reported that changes have now been made at the works which will make for safe and orthodox working.

Steel Review. Published by the British Iron and Steel Federation, Steel House, Tothill Street, London, S.W.1.

This issue contains a fascinating article by Mr. H. W. A. Waring, deputy chairman and general managing director of Guest Keen & Nettlefold Steel Company, Limited, on China. It is a thoughtful appreciation of China's present industrial and economic position and its future position in the world. Mr. Waring advocates entry of China into the United Nations and his arguments are well authenticated. Other articles in the *Review* deal with "Industrial Derating"; "Extending Britain's Home-ore Production," and "Cartels and Concentrations in the ECSC."

British Engineers' Handbook 1961. (Third Edition.) Published by the Association from 32, Victoria Street, London, S.W.1; price 21s.

This Association has an imposing list of important engineering manufacturing concerns as constituting its membership, and it is with these that the Handbook is concerned. The main list details all the commercial information likely to be required. This is followed by a section carrying full-page advertisements of the member-firms; then, section III lists alphabetically the goods made by the members. The balance of the book repeats the information given in section III in the French, German, Spanish and Portuguese languages.

Company News

ATTON & COMPANY, LIMITED, ironfounders and pipework specialists, of Derby—Trading profit for the year to March 31, 1961, fell to £365,594 (£535,594), but dividend is being maintained at 12 per cent. with an 8 per cent. final, as forecast.

ANDERSTON FOUNDRY COMPANY, LIMITED, railway engineers and ironfounders, of Middlesbrough—Following a net loss of £54,265 (£79,149) for the year to March 31, 1961, no dividend has been declared, but a capital distribution of 3d. per 5s. share has been made.

DOVER ENGINEERING WORKS, LIMITED, engineers and ironfounders, etc., of Dover (Kent)—Total distribution for the year ended March 31, 1961, is being raised to 15 (12½) per cent. with a final dividend of 10 per cent. Net profit rose to £42,087 (£38,231) after tax of £43,769 (£36,629).

CASTINGS, LIMITED, malleable and general ironfounders, of Walsall (Staffs)—Against a forecast of 7½ per cent. the company is paying a final dividend of 10 per cent. making a total of 17½ (15) per cent. for the year to March 31, 1961. Net profit rose to £141,611 (£118,245), after tax of £79,611 (£58,612).

F. PERKINS, LIMITED, manufacturers of diesel engines, of Peterborough (Northants)—Directors of the company, which is a subsidiary of Massey-Ferguson Holdings, Limited, propose to increase issued capital by capitalizing £1,400,000 of undivided profits and paying up in full 1,400,000 ordinary shares of £1 each to existing shareholders or as they may direct.

ALLIED IRONFOUNDERS, LIMITED—Despite an increase in group sales, excluding those of the new subsidiaries, trading profit declined to £2,764,800 (£2,946,532) for the year to April 1, 1961, due mainly to narrower margins arising from increased costs. The dividend is held at 20 per cent. on capital increased by the acquisition of Bilston Foundries, Limited, with an unchanged final of 12½ per cent.

GREENWOOD & BATLEY, LIMITED, electrical and mechanical engineers, ironfounders, tool makers, etc., of Leeds—Final dividend of 10 per cent. makes 15 per cent. for the year to March 31, 1961, the same equivalent as paid for 1959-60, adjusting for a 100 per cent. capitalization. Group net profit fell to £78,701 (£125,249) after tax of £62,831 (£100,826) and after crediting £7,492 (£113) tax over-provision.

MATHER & PLATT, LIMITED, general engineers, of Manchester—The company has purchased the entire share capital of Henderson Engineering Company, Limited, of Glasgow. It is understood that the Henderson Company will continue under its own name for some time and will continue to manufacture its own products. Chairman of Mather & Platt, Mr. William L. Mather, and Mr. J. Douglas Paybody, will join the board of the Glasgow firm.

LAPORTE INDUSTRIES, LIMITED—The need to raise additional finance in the future, possibly within the next 18 months, is emphasized by Mr. P. D. O'Brien, the chairman, in his annual report. Heavy capital expenditure lies before the group and the balance sheet at March 31 last shows outstanding contracts placed totalling about £2,142,000 against £560,000 previously. There is, too, a commitment by the parent company for about £3,250,000 to erect a titanium oxide plant in Western Australia, to be completed not later than December, 1964. Another commitment, at Warrington, is over £1,000,000. Since the end of the financial year, Laporte has acquired Elektrochemische Werke München.

200 first class Shell Cores per hour

With the
ANSON 200
SHELL COREMAKING MACHINE

TWO COREBOX PRINCIPLE
MEANS VERSATILITY
100 CORES OF ONE KIND
100 CORES OF ANOTHER
ALL OF MAXIMUM SIZE
ALSO MULTIPLE CORES

Ask also for details of the
ANSON 40 SHELL MOULDING MACHINE
and the ANSON SHELL CLOSING PRESS

FOUNDRY SUPPLIERS LIMITED

25A COCKSPUR ST., LONDON, S.W.1.

Phone: TRAfalgar 1141

Raw Material Markets

Iron and Steel

The engineering and speciality foundries continue to obtain fairly substantial outputs of high quality castings and most of them have sufficient work on hand to provide for a full normal five-day week production. Although demands for castings generally have fallen much below the boom period, substantial tonnages are now being consumed by the motor vehicle trade, and the machine-tool trade has stepped up its requirements. Castings for the heavy engineering, power, and electrical trades are also in good demand, while good support comes from the steelworks, and agricultural implement makers.

Many of the light foundries are short of work, and apart from those catering for the building trades, business is quiet. The highly mechanized plants of the foundries connected with the domestic utensil trade are operating well below the normal level. Many of the jobbing foundries are in need of more work, and the textile foundries are only moderately employed.

The iron foundries are able to obtain all the raw materials they need without difficulty. All grades of pig-iron are plentiful and deliveries could be stepped up on present tonnages if required. Furnaces supplying low phosphorus irons to the engineering and speciality foundries are able to cope quite easily with present demands; one or two brands are limited in production, but from overall outputs there are tonnages to spare. Hematite is in good supply and refined grades can be acquired without difficulty. The high phosphorus irons are also plentiful, and the furnaces have tonnages to spare after home requirements have been met.

There is still a shortage of heavy cast iron and machinery scrap, but in other types the foundries are able to obtain all the supplies they need. Foundry coke, ganister, limestone, and firebricks can be obtained to requirements.

Demands for the products of the re-rollers show no appreciable change. Reinforcing rods and bars are most heavily in demand, but only a moderate call is being made for small bars, light sections, and strip. Fairly prompt deliveries can now be obtained for these items, and orders available are in many instances below the required rolling quantities. Mild steel semis are in good supply and home steelworks are unable to dispose fully of the tonnages available. Carbon and alloy steel billets are more plentiful and consumers appear to be able to cover for their needs.

Non-ferrous Metals

The large turnovers on the London tin market during the last fortnight were prompted partly by the view that the ceiling price at which the Buffer Stock Manager had to sell tin would be raised to higher levels, and partly, too, by genuine demand from all sources. This in turn raised the question of how long the Buffer Stock Manager could continue to supply the market to keep the quotation for cash metal at the ceiling price of £880 a ton. The answer came on Tuesday of last week when the spot price went to £884 a ton, the Buffer Stock Manager having exhausted his supplies. During the next four trading days the price of tin shot up no less than £60 a ton to £939 a ton and the three months quotation to £943 a ton. This is the peak price reached since the Korean War and was due to the continued high level of demand from all over the world. In the US the reaction was much the same with the price jumping from around $1.13 to $1.20 cents a pound.

What of the outlook? At the moment, there is a good deal of tin held by consumers, which suggests that the tin market will become a good deal quieter. What will happen to the price depends, as always, on a multiplicity of factors but now there is the additional one of the consumers having to finance the holding of stocks, which can be expensive. Hence, if demand falters for any reason there will be a sharp reaction in the price.

The copper market is not strong, but its poor statistical position is counterbalanced by its sensitivity to external factors. Indeed, the recently sagging price trend was sharply reversed last week on the news of the US Maritime strike and on the report of Mr. Kaunda's plan for non-co-operation in Rhodesia. The outlook strongly suggests that if there is better news from these two fronts, the price will revert to its former habit of gradually but persistently weakening. New York also tends to blow hot and cold. Nevertheless the forward market is not good and there is little in the wind to indicate a great deal of startling change in this market at present. Meanwhile the price is stilled called at 31 cents a pound by both custom smelters and producers.

Lead is under the influence of the recently proposed US barter deals. If these could be settled the price will firm up. Meanwhile, the quotation in London is more often below £65 a ton than above it. In the US, the New York spot price is 11 cents a pound.

Zinc is dull in London with ample supplies to cope with the demand. Thus the price is fluctuating narrowly around £64-£65 a ton. In the US the market for ordinary zinc metal is satisfactory but stocks still press on the market. The US price for East St. Louis spot is unchanged at 11½ cents a pound.

House Organs

Vöest, the works magazine of the Vereinigten Osterr Essen, and Stahlwerke, Linze, Donau, Austria.

This issue, dated December, 1960, opens with a Christmas message to readers. The first article reviews the business done by the companies in 1960 by giving the coke, pig-iron, ingot, and sheet outputs, and the financial profit and turnover. A second article describes the launching at Bremen of the Wienetor by the wife of the Austrian Vice-Chancellor, Frau Maria Pittermann. It is to ply on the rivers connecting Austria with the North Sea and is the second ship now belonging to the Vöest fleet. Another article tells of the sale of L.D. plant to Japan. A description is also given in the magazine of the erection of a large building using vitreous-enamelled sheets. The last two pages list the newcomers to the works, weddings of employees, etc.

Wiggin Nickel Alloys No. 61. Issued by Henry Wiggin & Company, Limited, Thames House, Millbank, London, S.W.1.

This issue contains an illustrated description of a malleablising process for whiteheart castings. It deals especially with the fans which are being used to keep the gas circulating around the charge and are working under high temperature (1,000 deg. C) in a corrosive atmosphere. The fans are made of Nimonic 75 and Incoloy DS heat-resisting alloys, which are stated to give between 2 and 2½ years' service.

THERMOTANK, LIMITED—Mr. James Scott has been appointed a director.

REFRACTORY CONCRETE

Saves Time and Money

The ADAPTABLE Refractory Material UP TO 1800°C

The advantages are:

* FLEXIBILITY OF DESIGN
* MONOLITHIC CONSTRUCTION
* LOW INSTALLATION COST
* AVOIDANCE OF DELAY

REFRACTORY CONCRETE . . .

. . . is ready for use and has a high cold strength at 24 hours.
. . . reduces joints to a minimum.
. . . is stable under load up to 1350°C (with Ciment Fondu) and 1800°C (with SECAR 250).
. . . requires no pre-firing.
. . . does not spall under widest sudden fluctuations of temperature.
. . . can be pre-cast into shapes of practically any size free of distortion.
. . . when made with SECAR 250 has a particularly high resistance to slag attack and reducing atmospheres.

CIMENT FONDU Reg. Trade Mark ALUMINOUS CEMENT — up to 1350°C — WITH SUITABLE REFRACTORY AGGREGATES — up to 1800°C — SECAR 250 REGD. TRADE MARK

WRITE FOR BOOKLETS 'REFRACTORY CONCRETE' AND 'SECAR 250'

LAFARGE ALUMINOUS CEMENT CO. LTD. 73 BROOK STREET, LONDON, W.1. Telephone: MAYfair 8546

AP67

Current Prices of Iron, Steel, and Non-ferrous Metals

(Basis prices, delivered unless otherwise stated. In accordance with Iron and Steel Board Price Determination, 1961, No. 2, the prices of products listed below coming under the board's control are increased by 1 per cent.)

June 28, 1961

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over, Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P, 10-ton lots or over, £23 5s. 0d., delivered Birmingham; £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d.; South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone, £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(per ton unless otherwise stated, delivered)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si, £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy, 75 per cent. Si, £62 0s. 0d. to £66 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s.10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 10s. 3d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 13s. 3d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr.; 0.10 per cent. C,* 1s. 9¾d. to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £275 0s. 0d.; 96/98 per cent., £285 0s. 0d.

Ferro-columbium.—65/67 per cent. Cb + Ta, 19s. 0d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £58 10s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C; £40 11s. 0d.; silico-manganese, £43 4s. 0d.

Billets, Blooms, and Slabs for Forging and for Stamping (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

* Average 68-70 per cent.

FINISHED STEEL

Heavy Plates and Sections (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £66 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £234 5s. 0d. to £234 10s. 0d.; three months, £238 5s. 0d. to £238 10s. 0d.; settlement, £234 10s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 3½d. per lb.; rods, 255s. 0d. per cwt. basis; 20 s.w.g., 290s. 0d. per cwt.

Tin.—Cash, £936 10s. 0d. to £937 0s. 0d. ; three months, £938 10s. 0d. to £939 0s. 0d.; settlement, £937 0s. 0d.

Lead (Refined Pig).—Second half June, £66 10s. 0d. to £65 15s. 0d.; second half September, £67 15s. 0d. to £68 0s. 0d. settlement, £66 15s. 0d.

Zinc.—Second half June, £79 0s. 0d. to £79 2s. 6d.; second half September, £80 5s. 0d. to £80 7s. 6d.; settlement, £79 2s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £115 15s. 0d.; rolled zinc (boiler plates), all English destinations, £113 10s. 0d.; zinc oxide (Red Seal); d/d buyers' premises, £95 0s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 10½d. per lb.; sheets to 10 w.g., 202s. 6d. per cwt.; wire, 2s. 9½d.; rolled metal, 202s. 6d. per cwt.

Brass (Brazing).—BS1400, B3, £180; B6, £228.

Brass (High Tensile).—BS1400, HTB1, £197; HTB2, £215; HTB3, £233.

Gunmetal.—BS1400, LG2, £223; LG3, £233; G1, 1½%, £303; G1, 1%, £293.

Phosphor Bronze.—BS1400, PB1 (AID released), £319; BS1400, 90/10/1, £307.

Leaded Phosphor Bronze.—BS1400, LPB1, £247.

Phosphor Bronze Strip, etc.—Strip, 305s. 6d. per cwt.; wire, 4s. 3d. per lb.; rods, 3s. 5½d.; tubes, 3s. 5½d.; chill cast bars, solids 3s. 5¾d.; cored, 3s. 6¾d. (CHARLES CLIFFORD LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 11d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 4d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 3d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 2½d. to 2s. 3d. per lb.; Antimony, English, 99 per cent., £230 0s. 0d. Quicksilver, ex-warehouse, £67 0s. 0d. Nickel, £600 0s. 0d. Aluminium, ingots, £186 0s. 0d.; aluminium bronze (BS1400), AB1, £251; AB2, £258.

DOING
WHAT
COMES
NATURALLY

The instinct a child has for play is as natural as birth. Jumping, climbing and running are normal outlets.
In the world of non-ferrous metals Platt's bring an inherent flair to the manufacture of
brass, bronze, gunmetal, zinc and lead alloys.
Platt's are only doing what comes naturally by giving you consistent purity and meticulous specifications to ensure better end products; prices that are so keen that they will surprise you; and helpful advice that may well save costly teething troubles.

Platt
METALS LTD
ENFIELD MIDDLESEX HOWARD 3351

PIG IRON, All Grades
METALLIC ABRASIVES
SHOTBLASTING MACHINERY
FOUNDRY MACHINERY

WILLIAM
JACKS
AND COMPANY LIMITED

HEAD OFFICE
WINCHESTER HOUSE
OLD BROAD STREET
LONDON EC2
LONdon Wall 4774

And at:
BIRMINGHAM 5
Lichfield House,
Smallbrook Ringway
Midland 3375/6

GLASGOW C2
93 Hope Street
Central 9969

FERRO SILICON 12/14%
ALLOYS & BRIQUETTES
FOUNDRY COKE
LIMESTONE
GANISTER
MOULDING SAND
REFRACTORIES

E

Imports and Exports of Iron and Steel in April

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in April this year. Totals for the first four months of 1960 and 1961 are also included.

Total Exports of Iron and Steel

Destination.	Month ended April 30.	Four months ended April 30.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Malta	637	2,486	2,155
Sierra Leone	380	1,879	4,436
Ghana	1,838	7,799	6,611
Nigeria	5,230	22,587	27,859
Union of South Africa	4,948	25,080	23,142
South-West Africa	799	2,646	6,064
Rhodesia and Nyasaland	3,027	7,150	13,983
Tanganyika	2,291	2,951	9,371
Kenya	4,061	7,173	15,190
Uganda	411	548	2,022
Mauritius	332	1,425	863
Bahrein, Qatar, and Trucial States	2,135	6,078	6,813
Kuwait	2,924	1,978	7,454
India	12,696	89,905	78,524
Pakistan	6,510	25,578	16,604
Singapore	2,499	5,623	9,019
Malaya	2,428	6,662	10,624
Ceylon	5,854	16,895	14,119
British North Borneo	256	1,477	1,094
Hongkong	6,366	22,887	22,482
Australia	12,877	56,791	65,228
New Zealand	23,862	31,563	104,666
Canada	12,845	78,301	42,221
Jamaica	927	9,410	6,285
Trinidad	4,525	16,714	13,606
British Guiana	1,427	2,692	3,715
Other Commonwealth countries	1,818	9,503	9,248
Eire	6,790	20,562	26,265
Soviet Union	1,302	9,616	8,695
Finland	4,251	14,725	18,079
Sweden	18,389	72,154	63,491
Norway	11,368	45,010	42,146
Denmark	7,310	36,505	31,377
Poland	3,536	4,464	7,261
Western Germany	7,423	61,216	31,054
Eastern Germany	2,308	11,434	8,396
Netherlands	12,029	46,865	43,493
Belgium	2,224	12,537	9,302
France	1,247	2,701	3,428
Switzerland	2,544	4,259	7,121
Portugal	2,190	5,289	8,374
Spain	3,036	15,714	7,810
Italy	5,235	14,817	22,247
Austria	443	1,800	1,931
Yugoslavia	4,535	16,368	16,085
Greece	1,599	6,314	12,398
Turkey	1,774	1,646	6,607
Netherlands Antilles	54	1,775	333
Portuguese East Africa	55	1,557	987
Egypt	1,438	6,292	13,458
Libya	1,045	2,545	3,350
Sudan	357	4,031	3,025
Israel	1,313	7,805	7,596
Saudi Arabia	155	179	468
Iraq	1,645	8,665	19,863
Iran	4,345	27,647	9,629
Burma	423	2,949	1,825
Thailand	474	2,774	2,231
Indonesia	303	11,661	2,374
China	1,615	21,139	9,405
Japan	11,515	30,264	42,416
Philippine Republic	118	4,207	1,177
USA	10,319	104,723	35,675
Cuba	41	3,886	691
Mexico	387	2,752	1,654
Colombia	819	3,266	4,789
Venezuela	2,008	18,339	7,896
Ecuador	333	898	1,112
Peru	1,662	2,523	3,281
Chile	213	904	1,272
Brazil	1,422	7,180	4,519
Uruguay	1,256	3,418	3,871
Argentina	22,255	38,299	50,023
Other foreign countries	3,362	25,780	23,055
TOTAL	292,358	1,213,236	1,154,928

MORE THAN 1,200 PEOPLE went to Blackpool recently for the work's outing of Richard Sutcliffe, Limited, mechanical-handling equipment engineers.

Total Imports of Iron and Steel

From	Month ended April 30.	Four months ended April 30.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Union of South Africa	3,517	14,957	12,424
Rhodesia and Nyasaland	2,220	2,569	15,934
Canada	2,136	11,125	52,857
Other Commonwealth countries and Eire	1,120	10,545	12,023
Soviet Union	1,751	13,548	8,570
Sweden	3,617	15,452	18,012
Norway	5,912	46,630	38,100
Poland	74	8,411	492
Western Germany	1,904	57,989	13,003
Netherlands	13,100	68,381	40,883
Belgium	2,839	35,233	19,366
Luxembourg	796	4,962	9,644
France	1,748	24,154	9,258
Italy	26	8,318	230
Austria	500	4,483	2,133
Japan	370	2,768	2,761
USA	1,405	54,158	5,762
Other foreign countries	1,961	8,729	4,593
TOTAL	44,906	392,412	266,045
Iron and steel scrap and waste fit only for the recovery of metal	1,191	56,719	8,000

Exports of Iron and Steel, by Product

Product.	Month ended April 30.	Four months ended April 30.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Pig-iron	8,174	74,280	31,538
Ferro-columbium (niobium)	9	57	17
Ferro-tungsten	102	406	354
Other ferro-alloys	299	3,336	1,263
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	16,262	19,199	24,629
Pieces roughly shaped by forging	321	669	900
Iron bars, rods, angles, shapes, and sections	238	552	844
Steel bars, rods, angles, sections, and shapes	55,121	217,097	241,147
Iron plates and sheets	79	305	493
Universal plates	1,811	7,797	5,119
Steel plate, 3 mm. and under 4.5 mm. thickness	2,886	13,905	12,614
Ditto, 4.5 mm. or more in thickness	24,797	118,706	110,226
Blacksheets and blackplate	37,846	108,248	124,667
Hoop and strip	10,789	33,837	45,455
Tinplate	32,825	199,484	146,951
Decorated tinplate	343	1,611	2,237
Galvanized sheets	5,724	28,084	25,282
Other (incl. tinned sheets, terneplate, and ternesheets)	3,881	11,345	14,043
Railway and tramway construction material	17,170	41,875	78,246
Wire rods of steel (incl. alloy steel)	4,855	21,313	18,112
Wire	11,763	42,967	46,840
Tubes, pipes, and fittings	57,063	268,163	223,901
TOTAL	292,358	1,213,236	1,154,928

A CHANGE IN THE HOLIDAY PERIOD for the Leyland, Farington and Chorley factories of Leyland Motors, Limited, starting in 1962, is announced. The company's works holidays next year will be taken during the last two weeks of June, instead of the last two weeks in July as at present.

Baker Perkins Foundry Machinery at work.....

at R. & A. Main Ltd.

R. & A. Main Ltd. use this 'Medium' Rotary Table Shot Blast Machine for a wide range of application at a high production rate. The special control desk includes signal lights, 24 volt current socket for inspection and ammeters indicating the shot output of the patented bi-phase impellers. The wiring circuit is arranged for automatic operation to cut out human errors.

Please write for further details to:

Baker Perkins Ltd *Foundry Machinery Division*

Bedewell Works · Hebburn on Tyne · England *Tel: Jarrow 89713M* BP/F2

HISTORICAL NOTE

R. & A. Main Ltd. were established in Glasgow in the 1870's. Following the amalgamation with Thomas Glover & Co. Ltd. in 1897, extenstve sites were acquired at Edmonton and Falkirk. They produce a wide range of domestic appliances including the 'Century' gas cooker, the 'Century' gas heater and the Main No. 36.c. Refrigerator — the first to carry a ten year guarantee.

CLASSIFIED ADVERTISEMENTS

PREPAID RATES: **Twenty words for 10/- (minimum charge) and 4d. per word thereafter. Box numbers 2/6 extra per insertion (including postage of replies). Situations wanted 2d. per word throughout.**

Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATION WANTED

YOUNG practical FOUNDRYMAN, six years' managerial experience. Grey iron, malleable, some non-ferrous, seeks change. Technical representative - liaison officer. Box YP822, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

STEEL & GARLAND LTD., Priory Foundry, Worksop, require a FOUNDRY TECHNICIAN for development of CO, and hot-box core-making, shell cores and moulds and establishment of green-sand methods to replace dry-sand moulding. A young man of about 23 years of age is envisaged, who holds City & Guilds Full Technological Certificate in Foundry Practice or Higher National Certificate in Production Engineering, although equivalent qualifications will be considered if associated with suitable experience. The Company manufactures high grade grey iron castings for the refrigeration trade and machine tool industry.

SITUATIONS VACANT—*contd.*

SENIOR METHODS ENGINEER

Applications are invited for the position of Senior Methods Engineer with a leading South Wales Steel Foundry. Knowledge of piecework, rate fixing and estimating would be an advantage. The company operates a staff super annuation scheme. This is a staff appointment, carrying a salary in the region of £1,000 p.a. depending upon age and experience. Replies, which will be treated in confidence, and should give full details of age, experience and qualifications, to:

Works Manager, Brown, Lenox & Co. Ltd., Pontypridd, Glamorgan

GENERAL FOUNDRY MANAGER required, Midlands area. Splendid opportunity for experienced man with organising ability. Good salary and bonus. Box GF818, FOUNDRY TRADE JOURNAL.

FOUNDRY METALLURGIST — experienced foundry metallurgist required by a firm of foundry consultants. A sound knowledge of melting practice and the metallurgy of cast iron is essential. Applicant will be required to travel in Britain and the Continent. This post offers a wide scope of advancement and a good salary for a man with energy and initiative. Age preferably more than 30 years. Please apply to THE INTERNATIONAL MEEHANITE METAL CO. LTD., 4 Downside, Epsom, Surrey.

AIC **Executive Selection Division**

is advising on the following appointment

MANAGER, RESEARCH AND DEVELOPMENT LABORATORY

for a new fully mechanised plant in Dublin which is being set up to manufacture ferrous alloy castings. This Manager will take full charge of the Research and Development Laboratory and will be responsible for the development of all tooling, patterns, processes and production techniques required by the mechanised plant. Research into manufacturing techniques will be necessary. Candidates must have an Engineering Degree or equivalent, with adequate background experience of modern casting processes. Salary £2,000–£2,500. Preferred age 28 to 38 years. The Company plans to extend into other fields of manufacture which will demand a well trained engineer with a creative and energetic mind.

(Mr. D. Richardson: Reference 2676.)

Brief written applications should be sent in complete confidence to the Consultant Concerned at :

ASSOCIATED INDUSTRIAL CONSULTANTS LIMITED

BUSH HOUSE LONDON WC2

Associated Industrial Consultants

H. J. Maybrey & Co., Ltd.

require

ALUMINIUM-ALLOY GRAVITY-DIE

NIGHT FOREMAN

At least five years' experience in capacity of foreman, capable of working on own initiative, good administrator and disciplinarian. Five-night week, 7.30 p.m. to 6.30 a.m., weekly staff status. Salary £22.10s. per week inclusive of nightwork premium, plus production bonus. Contributory pension scheme after probationary period.

Gravity Die Casters (experienced)—Day and night shift. Basic rate plus piecework supplement plus piecework.

Casting Inspector—must be capable of marking off. A.I.D. approved an advantage. Rate 6/- to 6/6d. per hour according to experience.

Canteen and all usual facilities.

Details of experience and position held to—

Mr. S. B. DEW, *General Manager*,

H. J. MAYBREY & CO., LTD.

Worsley Bridge Road,

Lower Sydenham, London S.E.26

SITUATIONS VACANT—*contd.*

WANTED, qualified METALLURGIST to take full charge of Roll Foundry in South Wales. Must be fully conversant with Straight Carbon Chilled Rolls, Hollow Rolls, Indefinite Chill, S.G. Iron, etc. Applications, in confidence, should state age, experience and salary, to Box WQ819, FOUNDRY TRADE JOURNAL.

SALES REPRESENTATIVE required by large repetition Iron Founders, North Midlands. Previous experience in engineering or foundry trades essential, good prospects leading to executive position, car provided, pension scheme. Write stating age, experience and salary required. Box SR795, FOUNDRY TRADE JOURNAL.

TECHNICAL SALES REPRESENTATIVE required by Baibardie Ltd. for their well-known Volclay Wyoming and Panther Creek Southern Bentonites. Applicants should be well versed in sand practice. Preference given to man able to work from Birmingham office. Car provided. Pension Scheme in operation. Apply giving full particulars, age, etc. to W. TODD, BALBARDIE LTD., 176 Broad Street, Birmingham, 15.

YOUNG MAN, having completed Apprenticeship, required for position of trust as DEPUTY to Foundry Manager in Ferrous and Non-ferrous Foundry in the South West. Staff position with opportunity for advancement. Write stating age and details of experience to Box YM821, FOUNDRY TRADE JOURNAL.

BUSINESS OPPORTUNITIES

CONTROLLING INTEREST in small Ironfoundry, Birmingham district, established over 40 years.

Principal Director-Manager desires retire on age, and sell his interest to one having the necessary qualifications to continue successful management.

Owing to special circumstances £7,500 would purchase this interest and the position, which is yielding an income to the present Director of over £3,500 per annum excluding allowable expenses.

This is a straightforward, genuine opportunity to a man preferably about 40 years, and every assistance would be given by the retiring Director, who is fit and well able to continue indefinitely, but does not wish to do so, if a suitable successor can be found. Box CT824, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED

DIESEL GENERATING SETS. Ex Stand By. Particularly MEADOWS 75 KVA. All types considered.

BROADBENT BROS. (NOTTM.) LTD.
Daleside Road, Nottingham.
Telephone: Nottingham 53927.

TRACTOR Type Sand Slinger required. (Secondhand.) For sand mixing only. Box TT817, FOUNDRY TRADE JOURNAL.

25 TONS/HOUR continuous Sand Mill. 1-2 ton C.I. capacity, oil fired, hot metal tilting receiver. Box TT823, FOUNDRY TRADE JOURNAL.

MACHINERY WANTED—*contd.*

WANTED. Centriblast Rotary Barrel. B. B. KENT LIMITED, Ming Street, E.14. Telephone: East 4147.

Cleveland Plant and Machinery Co., Ltd.,
want your
Surplus Foundry Plant and Forging Equipment
Best prices given
Wharncliffe House
44 Bank Street
Sheffield, 1
Tel. No. 29051

TWO COLEMAN WALLWORK WT562AX or WT562AY. Alternatively WT562A. Also Coleman Power Jolt Core Rollover. State where machines can be inspected, approximate month and year of manufacture, present condition and whether any spares are offered with the machines. Box CW811, FOUNDRY TRADE JOURNAL.

AREA REPRESENTATIVE
for
HENRY WALLWORK & Co. Ltd.

Manchester Ironfounders specializing in high quality Grey-Iron Castings.

Initial salary about £1,000–£1,150 plus profits participation, Company car' pension scheme, etc.

This appointment offers scope to a young man 25–33 who after an initial training period in the factory will be responsible to the Sales Director for a territory. Based on Manchester, he will maintain close contact with the Works and be responsible for obtaining new clients and servicing existing ones.

Desired qualifications are an engineering apprenticeship and experience of representation of engineering products, preferably connected with the Foundry Trade.

Please write briefly in the first instance quoting Reference No. 111 *to:—*

AA LTD

ASHLEY ASSOCIATES LIMITED
PETER HOUSE · MANCHESTER 1
Retained to advise on this appointment
THE STRICTEST CONFIDENCE WILL BE OBSERVED AND NO DETAILS OF CANDIDATES WILL BE PASSED TO CLIENTS WITHOUT CANDIDATES' PERMISSION

MACHINERY FOR SALE

Titan Coreblower, 75 lbs. capacity. Almost new.
King electric block, 5 tons capacity.
Abrasive Development Aqua-Spray wet type blast machine. Almost new.
Large and standard size Adaptable Moulding Machines.
Modern Rumbling Barrel, 6ft. by 3ft.
Large stock of geared Ladles up to 8 tons capacity. List on request.
Few Roper ladles and Roper ladle Hoists, 3 and 5 cwt. capacity.
New Bale-out and Liftout Furnaces. Please send for illustrated leaflets.
Monometer 800 lb. Aluminium capacity Rotary Furnace.
Large stock of small Moulding Boxes at low prices to clear. List on request.
Several Cummings coke-fired Furnaces.
Cummings oil Sand Mixer.
Two Pneulec jolt squeeze Moulding Machines.
Morgan Tilting furnace, type C.A. 400 lbs. capacity, complete with burner and fan.
200 assorted Keith Blackman Fans.
Suspended electric sieve.
Please write for our new stock list.

ELECTROGENERATORS LTD.
Australia Road, Slough, Bucks.
Tel.: Slough 22877 & 22094

CORE DRYING OVENS
Maker: Modern Furnaces & Stoves Ltd., Birmingham.

CONSISTING of three stoves each 6 ft. 3 in. high, 4 ft. 9 in. wide and 3 ft. 6 in. deep, coupled by common fire passage at floor level to a coke fired furnace 4 ft. high, 5 ft. wide and 3 ft. 6 in. deep. Total floor area 70 sq. ft.

STOVES: 63 cubic feet capacity each. Double doors with mounted thermometer. Provision for 20 shelves. 7 in. flue outlet at top of each oven centrally for separate control.

FURNACE: Coke hand fired. Ash pit 3 in. above floor level. Forced draught by electric motor driven fan mounted on top of furnace.

MOTOR: 1 h.p., 2,890 r.p.m., 440 volts, 3 phase.

These ovens are in good condition and no reasonable offer will be refused.

J. PARKINSON & SON (SHIPLEY), LTD.,
P.O. Box No. 28
Yorkshire.
Tel. Shipley 53231

---

3 FT. DIAMETER Drop-bottom Cupola at reduced price. T. Davies & Son, West Gorton, Manchester 12. East 0070.

Roper
LADLES
STOCK UP TO 5TON CAP.
E. A. ROPER & CO. LTD.
KEIGHLEY • Phone: 4215-6

MACHINERY FOR SALE—*contd.*

ONE 3 ton per hour Roper Cupola complete with Spark Arrester Motor and Fan. First Class condition. Dismantled. Apply Box OT820, Foundry Trade Journal.

All plant in Scottish Mechanised Foundry for Sale.

12 TPH Sand Plant with No. 3 August Mill. Conveyors over 4 J/S M/cs and F. P. & M. Slinger. Large capacity mould conveyors All commissioned 1958. Cupolas 3 and 4 TPH skip charged. Jackman S'blast. 12ft. by 10ft. 23,000 cfm wet dust collectors No. H12 Hansberg. Sterling and C.I. boxes, etc.

J. ARNOTT & CO.,
15, Carlyle Avenue, Glasgow, S.W.2

---

500 CU. FT. TILGHMAN VERTICAL DOUBLE ACTING AIR COMPRESSOR, type FC8B, 30 lb. working pressure, belt driven by 60 h.p. Slip Ring Motor 400 volt, 3 phase, 50 cycles. Complete with Starter. Also Vertical Air Receiver, 7 ft. × 3 ft. dia. Very good working order. Price complete £250 nett, delivery—immediate.

Apply: G. E. Simm (Machinery) Limited, 27, Broomgrove Road, Sheffield, 10. Tel. 64436 (5 lines).

BIGWOOD 30 in. D.E. Fettling Grinder.
Luke & Spencer Swing Frame Grinders.
Rowland Abrasive Wheel Cutting Off Machine.
Noble & Lund 30 in. Horizontal Band Saw.
Geared Ladles 2 cwt. to 3 ton capacity.
Four Small Pin Lift Jolters Pneumatic.
August Coke Fired Mould Drier.
Jackman 4 ft. Shot Blast Cabinet with Built-in Dust Arrestor.
Wallwork WT 562AX Moulding Machines.
BMM Sf2 Moulding Machines.
Pneulec 861 Moulding Machine.
Morgan 500 lb. A1 Tilting Furnace. Oil Fired.
Several Fans and Blowers.
Jackman 602 Moulding Machine.

FRANK SALT & CO. LTD.,
Station Road, Blackheath, Birmingham
Tel.: Blackheath 1635

SHOTBLAST MACHINES

All sizes Rooms or Cabinets. Ex stock or prompt delivery. Low prices.

Try us for

Spare parts & tungsten carbide nozzles.

Fully illustrated Catalogue free on request

Actual Manufacturers

ELECTROGENERATORS LTD.
AUSTRALIA ROAD, SLOUGH
Telephone: SLOUGH 22877
49 years of satisfactory service

MACHINERY FOR SALE—*contd.*

SAND MILLS:
PNEULEC 6 ft. dia. with Bucket Elevator, disintegrator, Skip Loader, 3/50/400 V.
AUGUST-SIMPSON 6 ft. dia. motorised.
MULLREX No. 2 size 4 ft. 6 in. dia. m.d.
ALSO others 3 ft. 6 in., 4 ft. and 5 ft. dia.
SAND MIXERS:
FORDATH 18 in. dia. pan, 3/50/400 V.
FORDATH 12 in. dia. pan, 3/50/400 V.
Spermolin 3 ft. long, 15 in. wide body.
COREMAKING MACHINES:
Fordath "Multiplunger."
Fordath "Junior."
MOULDING MACHINES:
B.M.M. Type RDO. Table 26 in. × 18 in.
B.M.M. Type AT5. Table 36 in. × 25 in.
B.M.M. Type AT4. Table 30 in. × 21 in.
B.M.M. Airdraulic Turnover Strippers.
Osborn 704L. Jolt Squeeze Strippers.
COLEMAN R2. COREBLOWERS.
Send your enquiries to:

S. C. BILSBY & CO.,
Hainge Road, Tividale, Staffs.
Tipton 2448
(established over 40 years)

TWW

AIRLESS Rotary Barrel Shot Blast Machine (Sand Wizard by Constructional Engineering Co.), size 44 in. × 40 in., complete with Elevators, Dust Extraction Plant, etc., arranged for 400/440/3/50.

Two B.M.M. Jolt Squeeze Turnover Moulding Machines, Model R.D.O.

B.M.M. Jolt Squeeze Turnover Moulding Machine, type RD5.

Brayshaw Gas Fired Muffle Furnace, 40 in. × 30 in. × 18 in., with blower, unbricked.

Lees Hall Gas Fired Crucible Furnace, capacity ½ ton aluminium, complete with blower.

Sirocco 30 in. dia. Cupola Blower.

Richards "Sandmaster" Portable Electric Sand Conditioning Machine.

15 cwt. Roper Hand Geared Crane Ladle. Oil Bath Gearing.

Wide range of Air Compressors always in stock.

THOS. W. WARD LTD.
BRETTENHAM HOUSE, STRAND, LONDON, W.C.2.
'Phone TEMple Bar 1515 (12 lines)

Remember · Wards might have it!

MATERIALS WANTED

WANTED

SCRAP ELECTRODE CARBONS GRAPHITE-OFFCUTS

details of tonnages and samples to

FINE GRINDING LTD
Blackhole Mine, Eyam, Derbys.
Phone: Eyam 227

MATERIALS WANTED—*contd.*

SCRAP ELECTRODE CARBONS
or
GRAPHITE OFF-CUTS
you have for sale, best prices will be given by
JAMES DURRANS & SONS LTD.,
Phoenix Works, Penistone, Yorkshire.

MATERIALS FOR SALE

ARTIFICIAL GRAPHITE ROLLS, varying dimensions, perfect condition. Box AG806, FOUNDRY TRADE JOURNAL.

pulverite

COAL DUST

lowest in ash

The STANDARD PULVERISED FUEL Co. Ltd
Head Office
47 VICTORIA STREET, WESTMINSTER
LONDON, S.W.1 TEL : ABBey 6255/6

MATERIALS FOR SALE—*contd.*

FOR SALE. 200 pairs of Galvanised Circular Moulding Boxes, 14 in. dia. × 4 in. × 4 in., fitted with stub pins and bushes. Almost brand new. These boxes can be inspected by appointment. Box FS813, FOUNDRY TRADE JOURNAL.

CAPACITY AVAILABLE

PRECISION WOOD PATTERN MAKING

A LEADING Firm of Air Compression and Transmission Equipment Engineers has available capacity in their Pattern Department for precision wood pattern making of all types. 60 years of development at your disposal. Please contact WHITTAKER HALL & Co. (1929) LTD., Black Lane Engineering Works, Radcliffe, Manchester.

VITREOUS ENAMELLING.—Capacity available for enamelling castings in all finishes (plain, mottle, marble, lustre etc.). Prompt delivery by our own transport. THE RUSTLESS IRON CO., LTD., Trico Works, Keighley, Yorks. Tel.: Keighley 3737

CASTINGS.—We can save your porous castings, ferrous or non-ferrous, by an approved impregnation process; sample castings treated. A.I.D. approved.—RECUPERO, LTD., 66, South Harrow Viaduct, Harrow, Middlesex. 'Phone: Byron 1178.

HEAT TREATMENT of Iron and Steel. Annealing, Normalising, Stress Relieving and Shotblasting. Prompt delivery by our own transport. THE RUSTLESS IRON CO., LTD., Trico Works Keighley. Tel. Keighley 3737.

CAPACITY AVAILABLE—*contd.*

ENGINEERING COMPANY has full facilities for the complete reconditioning of all types Moulding and Coreblowing Machines etc. Good delivery and reasonable costs ensured. Also can undertake making special purpose machines and tools to your outline design. Box EC803, FOUNDRY TRADE JOURNAL.

CAPACITY offered for all types of Non-ferrous Castings. Up to 6 cwt. L. C. JAY & SON LTD., 21, Oak Street, Norwich. Tel. 28798.

CAPACITY available for iron and Steel Castings, Sand and Shell Moulding, pattern making capacity. Enquiries invited: ENFIELD CASTINGS, LTD., Station Road, West Horndon, Essex.

PATTERNMAKERS

FOR successful castings from your plant. Pressurecast matchplates, precision wood or metal pattern equipment can be purchased quickly, competitively, from BOOTH BROS. ENGINEERING, Baggrave Street, Leicester. Tel. 67020.

PATTERNS for all branches of Engineering for Hand and Machine Moulding.—FURNISTON & LAWLOR, LTD., Letchworth.

PATTERNMAKERS
(Engineering) CO. LTD.
Shrewsbury Road, London, N.W.10.
PATTERNS
CASTINGS
Phone : ELGAR 8031/2

LEADING LONDON PATTERN MAKERS

R.J. FRANKISS
(PATTERNS) LTD.
SPECIALISTS IN WOOD, METAL, EPOXY RESIN
PHONE: PRO 5140
MARKET ROAD, RICHMOND, SURREY.

STANSBY *for* **PRECISION PATTERNS**
Established over half a century
W. STANSBY & CO. LIMITED
STANGROVE WORKS, MILL LANE, ALTON, HANTS. PHONE: ALTON 3085

WOOD — RESIN — METAL

PATTERN MAKERS

PLATE OR LOOSE PATTERNS, MODELS, ETC.

Good accurate work at competitive prices and prompt delivery. Under personal supervision.

J. H. MAY LTD.

117, CENTRAL STREET, LONDON, E.C.1

CLErkenwell 5085 & 3509

Branch Works: CROWN WHARF, DACE ROAD, OLD FORD, E.3 AMHerst 3411

PHONE: SHEFFIELD 50040

J. S. PATTERN PRODUCTS

191 VINCENT ROAD, SHEFFIELD 7

ENGINEERS' PATTERNMAKERS

B. LEVY & COMPANY (PATTERNS) LIMITED

FULLY-MACHINED METAL PATTERNS, coreboxes, core-driers and setting-jigs for SHELL-MOULDING and machines.

WOODEN PATTERN EQUIPMENT of all sizes and types for loose-pattern and plate moulding.

EPOXY RESIN MULTIPLES and replacement equipment. (Plastic Patterns)

KEEN QUOTATIONS RELIABLE DELIVERIES

B. LEVY & CO. (PATTERNS) LTD., 1-5 OSBERT STREET, LONDON, S.W.1

TELEPHONE: VICTORIA 1073 or 7486

SCOLS

SUPER IRON CEMENT

Unequalled for repair of blow holes and other defects in foundry work. Sets hardest and becomes integral part of casting. Withstands oil, steam, water. Write for details.

MAJOR, ROBINSON & CO., LTD

SCOLS WORKS, WARWICK RD. SOUTH, MANCHESTER 16.

4694

Metal treatment

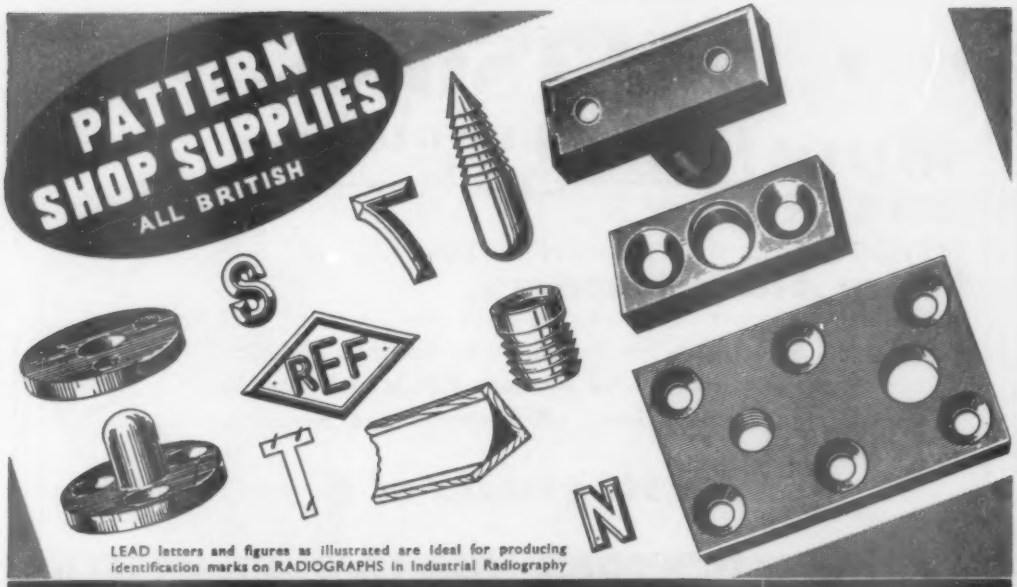
and Drop Forging

A monthly journal devoted to the properties, uses, testing and treatment of special steels and light alloys, and to forging technique in all its branches, 2/6d. per copy, 30/- yearly.

Write for a specimen copy to:

Metal Treatment and Drop Forging

John Adam House, 17/19, John Adam St., London, W.C.2



LEAD letters and figures as illustrated are ideal for producing identification marks on RADIOGRAPHS in Industrial Radiography

JOHN BURN & CO. (B'HAM) LTD.

5 HENSHAW ROAD, SMALL HEATH, BIRMINGHAM 10

Phone: VICTORIA 0137 ESTD 1904 Grams: REQUISITES B'HAM

'GREENS' OF KEIGHLEY

Specialists in . . .

FOUNDRY MELTING EQUIPMENT SINCE 1900

We supply everything from stockyard to the mould conveyor

Send your enquiries to:—

GEORGE GREEN & CO.

DEVONSHIRE STREET, KEIGHLEY, YORKS.

'Phone: 3728 (2 Lines) KEIGHLEY *'Grams: "CUPOLA" KEIGHLEY*

AGENTS FOR LONDON AND HOME COUNTIES: MOLINEUX FOUNDRY EQUIPMENT LTD., MARLBOROUGH ROAD, LONDON, N.19

AGENTS FOR THE MIDLANDS: R. J. RICHARDSON & SONS LTD., COMMERCIAL STREET, BIRMINGHAM 1

AGENTS FOR SCOTLAND: ALBERT SMITH & CO., 60 ST. ENOCH SQUARE, GLASGOW, C.1

WATSONS
(METALLURGISTS) LTD.

Ferro Alloy Powders,

All meshes, for Inoculations, Coatings, Spraying and Dusting. All Foundry Metals and Supplies for Steel or Iron. Refractories and Reagents.

All grades of Ferro Alloys

PULVOMETAL WORKS, MILL LANE, DRONFIELD NEAR SHEFFIELD

Telephones: 3136-3137 Dronfield *Telegrams: Cargo, Dronfield*

HARGRAVES BROS.
(MANCHESTER) LTD.
31, QUAY STREET, MANCHESTER, 3.
SPADES—SHOVELS
COKE FORKS
'PHONE BLACKFRIARS 9510
FOR ALL FOUNDRY SUPPLIES

Scotland's Foundry Suppliers—
L. A. WITHAM & CO.,
"LAWCO" Foundry Suppliers,
50-52 Vine Street, GLASGOW, W.1. WESt 2477
Sole Scottish Agents. All ex-Glasgow Stock.
CHAPMAN & SMITH LTD. "Sa-Fir" Masks, Refills, Goggles, Visors, etc.
THOS. W. WARD LTD. "Tuffking" Safety Footwear. Moulders' Protective Boots.
F & M SUPPLIES LTD. "Supinex" R Core Binder. "STOLIT" Pattern Cement.
"PARTEX" Parting Powder and Liquid. "FERIN" Iron Cement. "SUPIN" 62 for C.O.2 Knock Out. "FOLGUM Core Gum, and Liquid Core Adhesive.
W. J. HOOKER LTD. STERLING DIE & PLUNGER SLICK. ALUMINIUM TAPER SNAP FLASKS. (Adjustable Sides.) "HOOKERLITE" CORE PLATES.
A.E.I. PLASTICS (Aldridge) Ltd. PLASTIC PATTERN LETTERS. ¼in. to 2in. 50% cheaper than Metal Letters.

BLACK SEAM AND HISEGAR REFRACTORIES
Linings, Patchings, Cements, Ground Fireclay. Firebricks, Foundry Sands and Compo.
MIDLAND MONOLITHIC FURNACE LINING COMPANY LIMITED
GOOSE LANE, BARWELL, LEICESTER

BLACK SEAM
preheated downdraught
CRUCIBLE FURNACES
Coke, Oil or Gas Fired
Free demonstrations at your works
Tel. Earl Shilton 2061/2 (2 lines)

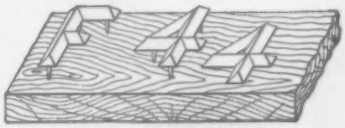
• *Re-introduced after many years* —

STYLE II

THE ALUMINIUM PATTERN LETTERS

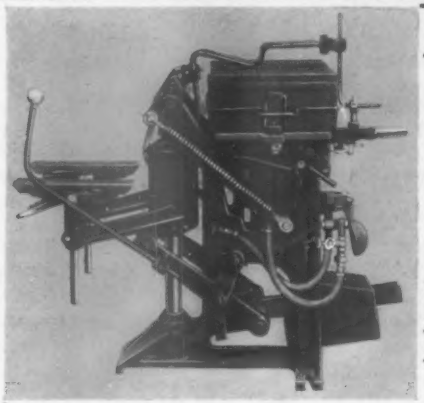
WITH THE LETTER AND POINTS
ALL IN ONE PIECE

NO STEEL PINS TO BREAK THROUGH AND SPOIL THE FACE



NOW MADE IN ENGLAND — LARGE STOCKS — PROMPT DELIVERY

J.W.& C.J. PHILLIPS LTD.
POMEROY ST., NEW CROSS, LONDON, S.E.14.



MACNAB

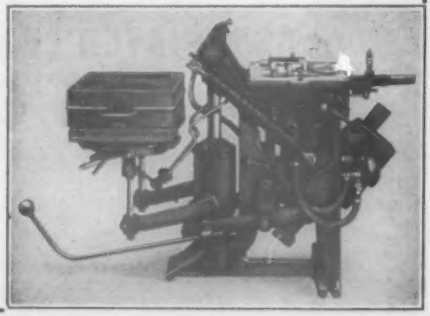
POWER JOLT RAM HAND ROLLOVER MECHANICAL PATTERN DRAW MACHINE

- *SIZE OF TABLE. 14" × 16"*
- *PATTERN DRAW. 8"*
- *LOAD CAPACITY AT 80LBS. 150LBS.*

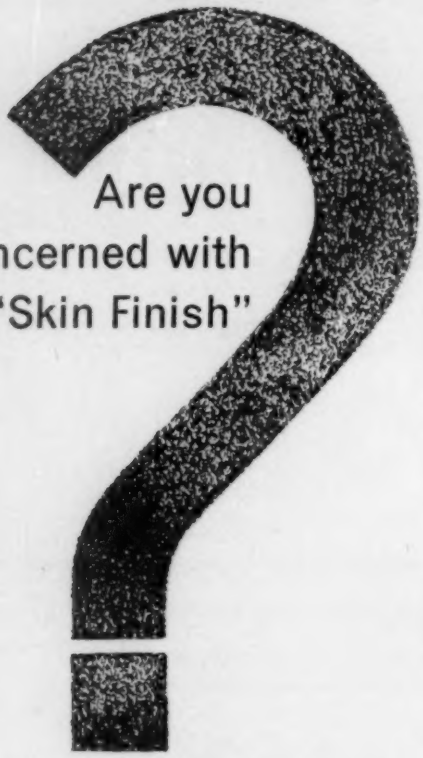
THE IDEAL MACHINE FOR MEDIUM SIZE BOXES AND DEEP WORK
EQUALLY SUITABLE FOR MOULDS OR CORES.

We manufacture many other types and sizes of Moulding Machines

Catalogues will be sent on request.



MACNAB & CO. LTD.
235, IMPERIAL DRIVE, HARROW, MIDDX.
TEL. PINNER 0600



Are you concerned with "Skin Finish"

then use

zircosil

ZIRCON SAND AND FLOUR

for cleaner castings.

ASSOCIATED LEAD
Manufacturers Limited

Zircon Division, Crescent House, Newcastle upon Tyne 1.

CONTACT THE SPECIALISTS FOR

CHEMPRODUX

BENTONITES

SODIUM-BASED AND CALCIUM-BASED

REDUCE YOUR COSTINGS • IMPROVE YOUR CASTINGS

Excel in quality and consistency
Keen prices backed by willing and efficient service
Good stocks held

You should enquire now for full details and quotations from :—

PRODUCTION CHEMICALS (Rochdale) LTD.
Victoria Buildings, 32 Deansgate, Manchester 3
Telephone : Blackfriars 3396 & 3851
Telegrams/Cables : Chemprodux, Manchester
INT. TELEX : 66-330

BUCKLAND RESIN-COAT SAND
FOR SHELL MOULDS AND CORES

SANDS FOR CO_2 PROCESS AND OIL CORES

YOU CAN BE ASSURED OF A GOOD FINISH BY ALWAYS USING BUCKLAND SANDS
The Finest Obtainable

BUCKLAND SAND & SILICA Co. LTD.

Sole Distributors of
BUCKLAND DRIED SANDS
A. ELDER REED & CO. (SALES) LTD.
103-105 BATTERSEA HIGH ST.
LONDON, S.W.11
Telephone : Battersea 6652
and 177 CORPORATION ST. BIRMINGHAM
Telephone : Central 7642

REIGATE HEATH · REIGATE SURREY TELEPHONE : REIGATE 2272
ESTABLISHED OVER 35 YEARS

AMBER OILS LIMITED

announce

Reduced Prices

for

AMBERSIL

FORMULAS ONE and TWO

THE FINEST ANTI-STICK AND MOULD RELEASE AGENTS

JUST A LITTLE SQUIRT ON THE MOULD and AMBERSIL does the rest!

- ★ High Heat Resistance
- ★ Low Surface Tension
- ★ Water Repellant
- ★ Non-Inflammable, Inert
- ★ Simple Aerosol Application
- ★ Penetrates Inaccessible Areas
- ★ Reduces Rejects
- ★ Improves Finish
- ★ Handy Economic 12 oz. Size

New Prices Per 12 oz. Aerosol

(Delivered Free)

FORMULAS 1 & 2

Singles	1 Dozen	2 Dozen	6 Dozen	1 Gross
15/-	13/-	12/-	11/-	10/-

AMBER OILS LIMITED

11A, ALBEMARLE STREET, LONDON, W.1.

Mayfair 6161/5

Well Mix No. 70

THE FINEST GRAPHITISED GROUND MATERIAL FOR LINING HOT BLAST CUPOLAS

- * Easy to ram.
- * Easy to patch.
- * High resistance to basic slags.
- * Promotes high carbon pickup & good sulphur reduction.
- * Long life.
- * More economic than basic refractories.

WELL MIX No. 70 is produced by

PICKFORD, HOLLAND & CO. LTD

381, FULWOOD ROAD, SHEFFIELD

TELEPHONE 33921

NON-FERROUS INGOTS

SINCE 1888

A.I.D., A.R.B. & ADMIRALTY APPROVED

- GUNMETAL • BRASS
- PHOSPHOR-BRONZE
- LEAD-BRONZE
- BRAZING METAL
- MANGANESE-BRONZE
- ALUMINIUM-BRONZE
- NICKEL SILVER • ALUMINIUM

ALSO SELECTED SCRAP METALS

THE CITY CASTING & METAL CO. LTD.

BARFORD STREET • BIRMINGHAM 5

Telegraphic Address: "Turnings" Birmingham — Telephone: MIDLAND 0845

Conkos NO.1

SUPER-DUTY CASTABLE PRE-MIX

1800° C

A ready mixed refractory concrete

for service temperatures up to 1800° C within 24-hours.

High resistance to spalling, chemical attack, thermal shock, slag and scale.

Has negligible drying and firing shrinkage. Needs no special pre-firing procedure.

High chemical purity—96% alumina.

PARTICULARS FROM

PURIMACHOS LTD., BRISTOL 2

COKE

FOR ALL PURPOSES

CAWOOD WHARTON & CO. LTD.

"SOUTHLANDS" HARROGATE. Tel. Harrogate 6868

ST. MARTIN'S HOUSE, LONDON, S.E.16 Tel. Woolwich 5232

NORMAN HOOKER (FOUNDRY SUPPLIES) LTD.

LARGE STOCKS of FOUNDRY MATERIALS AVAILABLE FOR IMMEDIATE DELIVERY

CO_2 & SHELL MOULDING SAND

A SPECIALITY

267a FINCHLEY ROAD, N.W.3

RING: HAMPSTEAD 3449 & 6304

a need for

HILLS

VENTILATION...

Alert companies are thinking *now* of ventilation . . . Hills *natural-action* ventilation. Simple, economical way of clearing smoke, fumes, steam, overheated air — the old enemies of output.
Have your secretary write Hills Technical Department now for assessment of type, location and number of ventilators needed on your premises.

...naturally **GOOD**

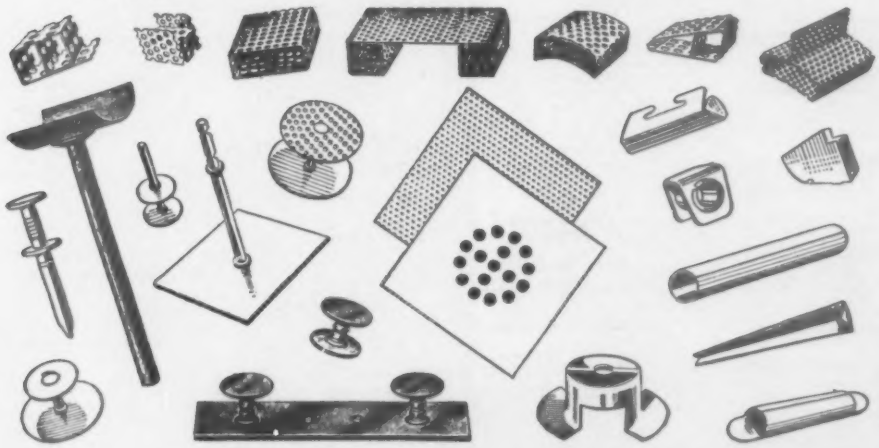
HILLS
industrial ventilators

HILLS (WEST BROMWICH) LIMITED
ALBION ROAD, WEST BROMWICH, STAFFS.
Telephone: West Bromwich 1811 (15 lines)
London: Chapone Place, Dean Street, W.1. *Telephone:* GERrard 0526/9.
Branches at: Manchester · Bristol · Glasgow · Newcastle upon Tyne

V13

CHAPLETS & STUDS FOR EVERY BRANCH OF FOUNDRY INDUSTRIES

WE ARE THE ORIGINAL MANUFACTURERS IN THIS COUNTRY WITH OVER 30 YEARS' EXPERIENCE



PRECISION PRESSWORK CO. LTD.

(PATENTEES)
CLIMAX WORKS, COLESHILL STREET, BIRMINGHAM 4, England
'Phone: Aston Cross 1402 Established 1874 'Grams: Precico, Phone, Birmingham

INDEX TO ADVERTISERS

	PAGE NOS.
A.E.I.-Birlec, Ltd.	—
A.E.I. Plastics (Aldridge) Ltd.	—
Acme Conveyors, Ltd.	—
Air Control Installations Ltd.	—
Albion Pulverising Co. Ltd.	—
Allan, John, & Co. (Glenpark), Ltd.	—
Alley Compressors, Ltd.	—
Amafond	—
Amber Oils, Ltd.	43
Anderson-Grice Co., Ltd.	—
Annealers, Ltd.	—
Armstrong Whitworth (M.I.), Ltd.	—
Ashworth Ross & Co., Ltd.	—
Aske, Wm., & Co., Ltd.	—
Ass. Lead Mfrs. Ltd.	42
Atlas Copco (G.B.), Ltd.	—
August's, Ltd.	32
Austin, E., & Sons, Ltd.	—
Badische Maschinenfabrik A.-G.	—
Bairds & Scottish Steel, Ltd.	—
Baker Perkins, Ltd.	33
Balbardie, Ltd.	—
Ballard, F. J., & Co., Ltd.	—
Ballinger, L. J. H., Ltd.	—
Beans Industries, Ltd.	—
Bellis & Morcom, Ltd.	—
Bennett, H. G., & Co. (Gloves), Ltd.	—
Berk, F. W., & Co., Ltd.	—
Bilston Stove & Steel Truck Co., Ltd.	—
Birkett, F. W., & Co., Ltd.	—
Birlec-Efco (Melting), Ltd.	—
Blackwell's Metallurgical Works, Ltd.	—
Bloomer, Holt, Ltd.	—
Boydell, E., & Co., Ltd.	—
Bradbury, John & Co. (Stockport), Ltd.	—
Bradley & Foster, Ltd.	19
British Acheson Electrode, Ltd.	27
British Aero Components, Ltd.	—
British Cast Iron Research Association	—
British Electrical Repairs, Ltd.	—
British Foundry Units, Ltd.	17
British Industrial Sand Ltd.	—
British Iron & Steel Federation	—
British Monorail, Ltd.	—
British Moulding Machine Co., Ltd.	1
British Oxygen Co., Ltd.	—
British Ronceray, Ltd.	—
British Shotblast & Engineering Co., Ltd.	—
Broom & Wade, Ltd.	—
Buckland Sand & Silica Co., Ltd.	42
Burn, John, & Co. (B'ham), Ltd.	39
Burnand, W. E., & Son, Ltd.	—
Canning, W., & Co., Ltd.	—
Carborundum Co., Ltd.	—
Catalin, Ltd.	—
Cawood Wharton & Co., Ltd.	44
Chapman & Smith, Ltd.	—
Chemicals & Feeds, Ltd.	—
Chetham Timber Co., Ltd.	—
Ciba (A.R.L.), Ltd.	—
City Casting & Metal Co. Ltd.	44
Clayton Crane & Hoist Co. Ltd.	—
Cleanair, Ltd.	—
Cohen, Geo. Sons & Co., Ltd.	—
Coleman-Wallwork Co. Ltd.	6
Combustion Chemicals, Ltd.	—
Consolidated Pneumatic Tool Co., Ltd.	—
Constructional Engineering Co., Ltd., The	12
Controlled Heat & Air, Ltd.	—
Conveyor & Shotblast, Ltd.	—
Cooke, Bailey, Ltd.	—
Coreshooters Sales, Ltd.	—
Corrosion, Ltd.	4
Cox & Danks, Ltd.	—
Crockett Lowe, Ltd.	—
Crooks, L. E.	—
Cumming, Wm., & Co., Ltd.	24
Dallow, Lambert & Co. Ltd.	—
Dickson, Roy Wilson, Ltd.	—
Distillers Co., Ltd., The	23
Dowler, H. J., Engineers & Pattern Makers, Ltd.	—
Dowson & Mason, Ltd.	—
Dunford & Elliott (Sheffield), Ltd.	—
Durrans, James & Sons Ltd.	11
Dustraction, Ltd.	—
Dustuctor Co., Ltd.	—
Dyson, J. & J., Ltd.	—
Electrical Development Association	—
Electrogenerators, Ltd.	—
Elliott Bros. (London) Ltd.	—
Elliott, E., Ltd.	—
Engineering Services (Manchester) Ltd.	—
Ertel Ores Ltd.	—
Escol Products, Ltd.	—
Evans, James, & Co., Ltd.	—
Evans, Roy, M.I.B.F.	26
Evans, Stanley N., Ltd.	13
Eyre Smelting Co., Ltd.	—
F. & M. Supplies, Ltd.	—
Feico Hoists, Ltd.	—
Filter-Heat, Ltd.	—
Fischer, George, Ltd.	—
Fisher-Foundries, Ltd.	—
Fletcher Miller, Ltd.	—
Flextol Engineering Co., Ltd.	—
Fordath Engineering Co., Ltd.	47
Foseco International, Ltd.	—
Foseco Ltd.	—
Foundry Equipment, Ltd.	28 & 29
Foundry Mechanisations (Baillot), Ltd.	21
Foundry & Metallurgical Equipment Co., Ltd.	—
Foundry Plant & Machinery, Ltd.	—
Foundry Suppliers, Ltd.	10 & 845
Foxall, William, Ltd.	—
Foxboro Yoxall, Ltd.	—
Frankise, R. J. (Patterns) Ltd.	37
Franklin Furnace, Ltd.	—
Fuel & Metallurgical Processes, Ltd.	—
Fullers' Earth Union, Ltd., The	—
G.W.B. Furnaces, Ltd.	—
Gas Council	—
General Electric Co., Ltd.	7
General Refractories, Ltd.	16
Gliksten, J., & Son, Ltd.	—
Goodyear Tyre & Rubber Co., Ltd.	—
Graphite Products	—
Great Lakes Carbon International, Ltd.	—
Green, E., & Son, Ltd.	—
Green, Geo., & Co.	39
Gregory, J. G., & Sons, Ltd.	—
Griffiths, A. E. (Smethwick), Ltd.	—
Guest, Keen Iron & Steel Works	15
Guyson Industrial Equipment Ltd.	—
Harborough Construction Co., Ltd.	—
Hargraves Bros. (Manchester), Ltd.	40
Harris & Pearson, Ltd.	—
Harvey & Longstaffe, Ltd.	—
Harvey, J. J. & Pressurecast, Ltd.	—
Hedin, Ltd.	24
Heneage Metals, Ltd.	—
Hepburn Conveyor Co., Ltd.	—
Heywood, S. H., & Co., Ltd.	—
High Speed Steel Alloys, Ltd.	—
Hills (West Bromwich), Ltd.	45
Holman Bros., Ltd.	—
Holmes, W. C., & Co., Ltd.	—
Holroyd & Hall, Ltd.	—
Hooker, W. J., Ltd.	44
Ilford, Ltd.	—
Incandescent Heat Co., Ltd.	—
Ingersoll-Rand Co., Ltd.	—
Interplas	—
J.S. Pattern Products, Ltd.	38
Jackman, J. W., & Co., Ltd.	—
Jacks, Wm., & Co., Ltd.	849
Joy Sullivan Ltd.	—
Keith Blackman, Ltd.	—
L.M.S. Products, Ltd.	—
Lafarge Aluminous Cement Co., Ltd.	847
Laidlaw, Drew & Co., Ltd.	—
Leicester Lovell & Co., Ltd.	—
Levy, B., & Co. (Patterns), Ltd.	38
Lones, Joseph, Laboratories	—
Lord, E. S., Ltd.	—
Luke & Spencer, Ltd.	—
Macnab & Co., Ltd.	41
Major, Robinson & Co., Ltd.	38
Mansfield Standard Sand Co., Ltd.	—
Marco Conveyor & Engineering Co., Ltd.	—
Mathison, John, Ltd.	—
Matthews & Yates, Ltd.	—
May, J. H., Ltd.	38
Mead McLean & Co., Ltd.	—
Mellor Mineral Mills Ltd	8
Metalectric Furnaces, Ltd.	—
Metalline Cement Co., The	—
Metals & Equipment (Wolverhampton), Ltd.	—
Midgley & Son, Ltd.	—
Midland Monolithic Furnace Lining Co., Ltd.	40
Midland Tar Distillers, Ltd.	10
Mine Safety Appliances, Ltd.	—
Modern Furnaces & Stoves, Ltd.	—
Molineux Foundry Equipment, Ltd.	—
Monometer Manufacturing Co., Ltd.	—
Morganite Crucible Ltd.	—
Morris, B. O., Ltd.	—
Morris, H., Ltd.	25
Newton Collins, Ltd.	—
Nicholl & Wood, Ltd.	—
Norris Equipment & Construction, Ltd.	—
North Derbyshire Metal Products, Ltd.	—
Norton Grinding Wheel Company, Ltd.	—
Norton Industries, Ltd.	—
Ormerod, R. E., Ltd.	—
Orthos, Ltd.	—
Palmer Aero Products Ltd.	—
Parish, J., & Co., Ltd.	—
Park & Paterson, Ltd.	—
Parker Mitchell Engineering Co., Ltd.	—
Parmelee (G.B.), Ltd.	—
Passe, J. F., & Co.	—
Paterson Hughes Engineering Co., Ltd.	—
Patterncrafts, Ltd.	—
Pearson, E. J. & J., Ltd.	—
Peco Machinery Sales, Ltd.	—
Perry, G., & Sons, Ltd.	—
Phillips, J. W. & C. J., Ltd.	41
Pickard, W., & Co., Ltd.	—
Pickford, Holland, Ltd.	43
Platt Metals, Ltd.	849
Pneulec, Ltd.	—
Polygram Castings Co., Ltd.	—
Precision Preswork Co. Ltd.	45
Price, J. T., & Co., Ltd.	48
Production Chemicals (Rochdale), Ltd.	42
Purimachos, Ltd.	44
Rapid Magnetic, Ltd.	—
Reavell & Co., Ltd.	—
Refined Iron Co. (Darwen), Ltd.	—
Reid, Wm., & Co.	—
Resinous Chemicals Ltd.	—
Richards Structural Steel Co., Ltd.	—
Richardson Eng'g., Ltd.	—
Richardsons Moss Litter Co., Ltd.	9
Richardsons, R. J. & Sons Ltd.	48
Ridsdale & Co., Ltd.	48
Robinson, Thos., & Son Ltd.	—
Robson Refractories, Ltd.	—
Roper, E. A., & Co., Ltd.	36
Rowland, F. E., & Co. Ltd.	—
Rubery Owen & Co., Ltd.	—
Rule & Moffat	—
Rustless Iron Co., Ltd.	—
Safety Products, Ltd.	—
Salter, Geo., & Co., Ltd.	—
Schieldrop & Co., Ltd.	—
St. George's Engineers, Ltd.	26
Seiber, J., Equipment Co., Ltd.	—
Sheffield Smelting Co., Ltd.	—
Sheppard & Co., Ltd.	—
Sintokogio, Ltd.	—
Sklenar Furnaces, Ltd.	—
Smedley Bros., Ltd.	—
Smeeton, J. A., Ltd.	—
Smith, A., & Co.	—
Smith, A. (S. & B. Foundry Sands), Ltd.	—
Smith, John (Keighley), Ltd.	—
Smiths Motor Accessories, Ltd.	—
Soles, J. M.	—
Spencer & Halstead, Ltd.	—
Spermolin, Ltd.	3
Stansby, W., & Co., Ltd.	37
Stanton Ironworks Co., Ltd., The	18
Staveley Iron & Chemical Co., Ltd.	—
Steels Engineering Installations	5
Stein, John G., & Co., Ltd.	—
Stephens, Wm., & Sons, Ltd.	—
Sterling Foundry Specialties, Ltd.	30
Sternol, Ltd.	—
Suffolk Iron Foundry (1920), Ltd.	—
Sutcliffe Speakman, Ltd.	—
Tallis, E., & Sons, Ltd.	—
Taylor, J. (Syston), Ltd.	—
Thomas, G. & R., Ltd.	—
Thomas, Gwyn., & Co.	—
Thompson, John, Instrument Co., Ltd.	—
Thomson & McIntyre	—
Thor Tools, Ltd.	—
Tilghman's, Ltd.	20
Union Carbide, Ltd.	2
Unit Engineering Co.	—
United Fireclay Products, Ltd.	—
United States Metallic Packing Co., Ltd.	—
Verrolec, Ltd.	—
Victor Products, Ltd.	—
Wagner Heinrich, Maschinenfabrik	—
Wai-Met Alloys Co.	—
Walker, I. & I., Ltd.	—
Walsh Bros.	—
Ward, Thos. W., Ltd.	—
Warner & Co., Ltd.	—
Warrington Red Moulding Sand Co.	—
Watsons (Metallurgists) Ltd.	41
West Midland Refining Co., Ltd.	—
Whitecross Co., Ltd.	—
Wild-Barfield Electric Furnaces, Ltd.	—
Wilkinson Rubber-Linatex Co., Ltd.	—
Wilson Crucible Co., Ltd.	14
Witham, L. A., & Co.	40
Woking Pattern Works, Ltd.	—
Woodward Bros. & Copelin, Ltd.	—

Published by the Proprietors, INDUSTRIAL NEWSPAPERS (FUEL & METALLURGICAL), LIMITED, John Adam House, 17/19, John Adam Street, London, W.C.2, and printed in Great Britain by HARRISON & SONS, LIMITED, by Appointment to Her Majesty The Queen, Printers, London, Hayes (Middx) and High Wycombe.

Above: Mould half for a 15 ton casting. Cold set Corovit mixes are immensely strong and do not sag.

Below: Corovit rib cores are as accurate as the core boxes from which they are made.

MASSIVE CORES AND MASSIVE SAVING

Coremaking time reduced from 200 to 94 hours using Fordath's "Corovit" cold-setting technique—but men's earnings are up by 15% in piece-work bonuses.

Corovit cold setting core techniques have been applied in the building-up of the upper half of this mould for the table of a 22 ft. diameter vertical boring mill. Corovit provides savings at every turn—reduced coremaking time, quicker stoving, easier knock-out. Dimensional stability and enormous strength mean that cores are far more accurate (less fettling and subsequent machining) with an improved surface finish.

Photographs by kind permission of George Richards & Co. Ltd., Broadheath, Altrincham, Cheshire.

Ask **FORDATH** about

COROVIT

COLD SETTING TECHNIQUE

COROVIT is manufactured and sold in the U.K. solely by FORDATH, who prepay licence fees to Reichold Chemie A.G. of Switzerland. Reichold are the proprietors of British Patents 653,530 & 761,035. Thus foundries using COROVIT are automatically free from liability to suit for infringement of these patents when they use peroxide-group accelerators in their cold-setting work.

THE FORDATH ENGINEERING COMPANY LIMITED, BRANDON WAY, WEST BROMWICH, STAFFS, ENGLAND.
Telephone: West Bromwich 1665. Telegrams: Fordath Telex West Bromwich. Telex No.: 33415

Bastable

FOUNDRY TRADE JOURNAL

EST. 1902

WITH WHICH IS INCORPORATED THE IRON AND STEEL TRADES JOURNAL

VOL. 110
No. 2325

JUNE 29, 1961

Registered at the G.P.O. as a Newspaper

Offices: John Adam House, John Adam St., London, W.C.2

Single Copy 1/-. By Post 1/4. Annual Subscription, Home 52/-. Abroad 60/- (Prepaid)

SHOTBLASTERS to the TRADE

QUICK SERVICE
PERSONAL ATTENTION

Quick deliveries of Chilled Iron Shot, "Durabrasive" Steel shot, "Blastyte" and Crushed Fruit Stones.

Photograph by kind permission of B.S.A. Co. Ltd.

A new Tilghman W.B.T. 4ft dual swing Table Plant recently installed at the Birmingham Small Arms Co. Ltd., Birmingham.

R. J. RICHARDSON & SONS LTD
ESTABLISHED 1867
COMMERCIAL ST · BIRMINGHAM · 1 ·
PHONE MID 2281 P.B.X.

A MEMBER OF THE STAVELEY COAL & IRON CO., LTD. GROUP

RIDSDALE & CO. LTD.
NEWHAM HALL MIDDLESBROUGH
for **SAND TESTING EQUIPMENT**
BRITISH LICENCEES H. W. DIETERT CO. U.S.A.

PRICE'S FIREBRICKS
As used by all the leading Iron and Steelworks and Foundries at Home and Abroad
Manufactured by
J. T. PRICE & CO. LTD., STOURBRIDGE